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Vol. 50 No. 1

Journal

Canadian Dental Association
January 1984

de l'Association Dentaire Canadienne
janvier 1984

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Oral Pathology
Radiology
Convention Issue — Part I

Pathologie Buccale
Radiologie
Congrès (Ière partie)

DERNIER NUMÉRO GRATUIT POUR LES NON-MEMBRES
LAST ISSUE TO CDA NON-MEMBERS

An important matter of judgement

Weigh the evidence[1-13]

There are few, if any, therapeutic decisions made more frequently than those involving so-called simple analgesic/antipyretic drugs. There are two basic choices. The decision can have far-reaching implications for many patients and also determine the efficacy of concomitant therapy.

ACETAMINOPHEN		ASA
	AT LABEL DOSAGE	
	EFFICACY	
equipotent	**ANALGESIC**	equipotent
equipotent	**ANTIPYRETIC**	equipotent
not indicated	**ANTI-INFLAMMATORY**	required dosage generally exceeds analgesic/antipyretic levels and regular administration is necessary — lesser or intermittent dosage is ineffective
	SAFETY	
hypersensitivity in rare instances	**ADVERSE EFFECTS**	GI bleeding, ulceration, nausea, vomiting, diarrhea, vertigo, tinnitus, hearing loss, pruritus, urticaria, angio-edema, anaphylaxis
slight increase in prothrombin time for patients on oral anti-coagulants but generally clinically insignificant	**PRECAUTIONS**	history of GI ulcerations, bleeding tendencies, anemia or hypoprothrombinemia; patients with asthma or other allergic conditions; concomitant use with anticoagulants, uricosurics, other non-narcotic analgesics, hypoglycemics, alcohol, methotrexate.
none, except rare hypersensitivity	**CONTRAINDICATIONS**	salicylate sensitivity, active peptic ulcer
no known risk	**IN PREGNANCY**	risk of anemia, hemorrhage, delayed or prolonged labour, increased risk of intracranial hemorrhage in premature infants, premature closure of the ductus arteriosus
no specific risk	**IN CHILDREN**	specific risk of intoxication using therapeutic dosage in febrile and dehydrated children
rare equivocal reports of reversible liver function abnormality at high dosage	**HEPATIC TOXICITY**	reversible hepatitis in apparent risk groups at high dosage
equivocal	**ANALGESIC NEPHROPATHY**	equivocal
oral anticoagulants (as above) chloramphenicol (increased half life)	**DRUG-DRUG INTERACTIONS**	oral anticoagulants, uricosurics, non-steroidal anti-inflammatory agents, oral hypoglycemics, corticosteroids, ethyl alcohol, methotrexate
	ACUTE OVERDOSE	
potentially serious	**CLINICAL RISK**	potentially serious
supportive management and/or specific antidote (N-acetylcysteine)	**TREATMENT**	supportive management — no specific antidote

References listed in brief prescribing information

For prescribing information see page 29

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R.R., Beverly Hills, CA

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- 66% Reline cementation of poorly fitting crowns on elderly patients that could not afford remaking.
- 49% Cementation of ceramic crowns.
- 36% Endodontic posts.
- 26% Cementation of stainless steel crowns.
- 25% Routine cementation of all crowns.
- 24% Use pulp protection on deep restorations.
- 22% Recementation of facings.
- 21% Frequently, but not always on vital teeth.
- 10% Cementation of the Maryland Bridge.
- 4% Only on non-vital teeth.
- 4% Orthodontic bands.

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D.M., New York City, NY

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"Most welcome addition to my dental materials."
B.G., Branson, MO

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R.D., Salem, SD

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E.D., Garden Grove, CA

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CANADIAN DENTAL ASSOCIATION

References: 1. Ostrom, C.A. et al., J Dent Res, 56(3):212-221, 1977. 2. Arends, J., ten Cate, J.M., J Cryst Gro, 53:135-147, 1981. 3. Silverstone, L.M., Caries Res, 11 (Suppl. 1):59-84, 1977. 4. Data on file at Procter & Gamble, Inc. 5. Mobley, M.J., J Dent Res, 60(12):1943-1948, 1981. For further information, please contact Crest Professional Services, P.O. Box 355, Station A, Toronto, Ontario M5W 1C5

Vol. 50 No. 1

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January 1984 janvier 1984

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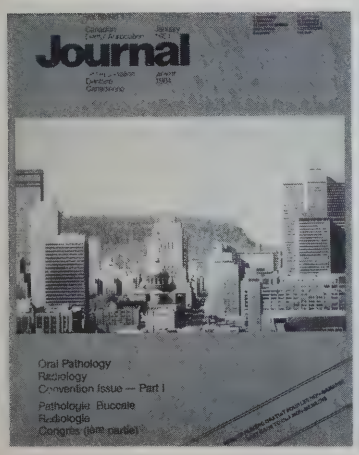

Oral Pathology
Radiology

Convention
Part I

Editorial

5 Carolyn Hackland, as acting editor tells readers the January issue will be the last to go to non-CDA members and that the Journal will get a new look in February.

Letters

11 Continuing education is not all there is to good dentistry, according to Dr. Jack Friedman.

In the News

12 **CDA Member Services**
Kenneth Ransby, a consultant with a Toronto investments firm talks about the benefits of the CDA RRSP plan available to members only.

14 **Guidelines for the Control of Radiation in the Dental Office**
CDA's Board of Governors recently approved these guidelines for the control and handling of x-radiation in the dental office.

19 **Canadian student wins U.S. dentistry award**
Keenman Feng, a UBC dental student, won an ADA dental editors award for his essay "Dentistry's Symbol" which is reprinted.

21 **CDA, CIDA and New Brunswick helping to set up program in St Kitts/Nevis**
CDA has been given a grant by CIDA to set up a dental health education and mouthrinse program in the Caribbean.

22 **Brian Henderson joins CDA as Director of Accreditation**
Mr. Brian Henderson, MEd., formerly of CMA, has joined CDA as new Director of Accreditation, replacing the retired Vic Chatwin.

24 **Clothes Maketh the Person**
"Jean Cives" a past contributor to the Journal has some thoughts on the dental wardrobe.

25 **Drug Diversion Attempts Continue**
Dentists are warned of the hazards associated with drug addicts and dealers posing as patients in order to get illicit drugs.

26 **Les Journées Dentaires 1984**
The complete program for the CDA-ODQ Convention, "Les Journées Dentaires 1984" is detailed.

38 **Continuing Education**
The latest listing of continuing education courses taking place until June 1984 at Canadian dental schools.

45 **Briefly**
Dental news items from across Canada and around the world are highlighted.

47 **Review of Library Services**
Services available to CDA members from the Library/Resource Centre and new acquisitions to date are listed.

51 **CDA Resource Centre**
The CDA Library/Resource Centre lists articles available on the subject of stress and anxiety in the dental patient. Also included is a list of new Library acquisitions.

Publications

54 **Dental Laboratory Procedures: Fixed Partial Dentures (4th Ed.)**
"The authors are to be congratulated for their attempt to chart a course between the chair and the bench."
— W. R. Teteruck, DDS, D. Gratton, DDS

55 **Hampson's Textbook of Operative Dentistry**
"The book is well written, easy to comprehend and has numerous excellent photographs and diagrams."
— M. Viny, DMD.

Articles

57 **CDA's DAT Committee Report**
CDA's Dental Aptitude Test Committee reports on the make-up of 1983-84 dental school applicants.

63 **British Columbia's Medical Services Act — some disquieting implications**
Dr. Wesley J. Dunn analyses B.C.'s Medical Services Act, revealing some implications for the dental profession.

Scientific

91 **Metastatic Disease and the Dentist** — P. Worthington

95 **Osteoradionecrosis of the Mandible** — M. Gornitsky et al

99 **Sinus Tracts of odontogenic origin** W. B. Donohue et al.

15 RRSP
23 Obituaries
104 Announcements
106 Marketplace
107 Advertiser's Index

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Canadian Dental Association Journal
January 1984
de l'Association Dentaire Canadienne
janvier 1984

Editorial

6 La rédactrice suppléante, Carolyn Hackland, annonce au lecteurs que le présent numéro est le dernier distribué gratuitement aux non-membres et qu'a compter de février, le Journal se présentera différemment.

69 **Services au Membres**
Kenneth Ransby, consultant d'une maison de placements de Toronto, énumère les avantages du REER de l'ADC qui est offert aux membres seulement.

Actualités

70 **Brian Henderson, directeur de l'Agrément**
Succédant au Dr. Vic Chatwin, M. Brian Henderson se joint à l'ADC à titre de directeur de l'Agrément. M. Henderson travaillait auparavant pour l'AMC.

71 **Directives touchant la réduction du taux des radiations dans les cabinets dentaires**
Le Conseil d'administration de l'ADC a agréé des directives touchant l'utilisation des appareils de radiographie dans les cabinets dentaires.

73 **Il se produit toujours des tentatives d'usage illicite des médicaments**
Les dentistes sont invités à se méfier des personnes qui vendent ou consomment des drogues et qui se prevent d'eux pour obtenir des drogues illicites.

74 **Efforts conjoints de l'ADC, de l'ACDI et du N.-B. pour établir un programme dentaire dans les Antilles**
L'ADC a reçu une subvention de l'ACDI pour établir un programme d'éducation dentaire à l'intention des enfants de St-Kitts et Nevis.

75 **L'habit fait-il le moine?**
"Jean-Cives", ancienne collaborateur du Journal, passe en revue les costumes des dentistes.

76 **Les Journées Dentaires 1984**
Programme complet des Journées Dentaires 1984, congrès mixte de l'ADC et l'ODQ.

88 **En bref**
Un tour d'horizon des principales nouvelles de monde dentaires.

51 **Bibliothèque et Centre de documentation de l'ADC**
Liste des articles disponibles touchant le stress et les inquiétudes du patient dentaire. Liste des nouvelle acquisitions.

23 Nécrologie
72 REER
104 Avis
106 Petites Annonces
107 Index des announceurs

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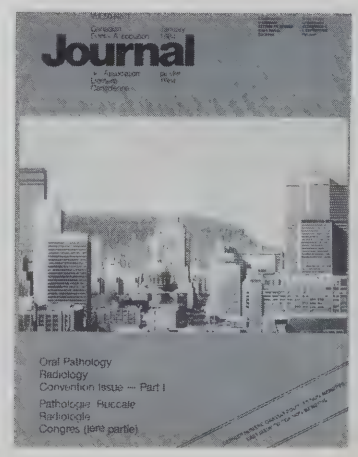

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Congrès — 1ère Partie

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Veuillez nous prévenir le 10 du mois de tout changement d'adresse pour recevoir le journal à votre nouvelle adresse le mois suivant.

Tout abonnement est payable à l'avance en dollars canadiens. Au Canada — $35, au États-Unis — $35, partout ailleurs — $38. Il comprend 12 numéros qui ne correspondent pas nécessairement avec les mois d'une même année.

La direction du Journal ne partage pas nécessairement les opinions qu'expriment ses collaborateurs à moins que l'Association Dentaire Canadienne ne les ait adoptées officiellement.

ISSN 0709-8936

THE END OF AN ERA

January 1984 marks the end of an era in CDA Journal history. The January 1984 issue of the Journal is indeed a rare animal — the last of a long line.

Two things make this Journal rare. One — it is the last Journal that will be distributed to non-members of the Canadian Dental Association. Two — it is the last Journal members and non-members alike will see incorporating the present design.

At the CDA Board of Governors' meeting in September 1983, a resolution was passed to limit the Journal distribution to members only. Thus the Journal, starting in February, will become another vital service which CDA provides to its members. Any Canadian dental practitioner who wants to continue to receive his or her Journal and keep up with the latest scientific, clinical and Association news, and is not currently a member of the Association, will have to join.

Those readers who are now thinking "So what if I lose the Journal?", might be in for a surprise in February.

Following your suggestions made in the recent Journal readership survey, it was decided to give the magazine radical cosmetic and internal surgery. Although still in the design stage at press time, the "new" Journal will incorporate some of the suggestions made through answers to the Readership Survey.

One major area that the new design will change is the French language section of the Journal. Starting in February, only those members who indicate that their language of choice is French will receive a French section, which will contain, news, Association reports and Brieflies. The rest of the magazine will contain articles (scientific, clinical and non-scientific), all published in the original language of the author, with either French or English summaries.

Members who indicate that their language of choice is English will receive the news, Association reports and Brieflies **only** in English, with the rest of the Journal being the same as detailed above. Thus there will be more room in the Journal for more articles, features and news (either scientific or non-scientific).

The intent of the redesigned CDA Journal is to bring this 35 year old magazine into the 80's and bring it up to the highest standard with the best scientific and clinical articles, status reports and national and regional news that this country and CDA's members have to offer.

We mean to make the Journal the best of its kind currently on the market, since CDA has a commitment to its members to provide the best services it can to Canadian dentists.

Starting in February 1984, with a new look, the CDA Journal will become one of CDA's finest member services.

Watch for it.

Carolyn Hackland
Acting Editor
CDA Journal

Éditorial

LA FIN D'UNE ÉPOQUE

Janvier 1984 marque la fin d'une époque dans l'histoire du *Journal de l'ADC.* Et le présent numéro constitue certes une pièce rare, puisqu'il est le dernier d'une longue série.

Une pièce rare pour deux raisons. Premièrement, c'est le dernier numéro qui sera distribué gratuitement aux dentistes qui ne sont pas membres de l'Association dentaires canadienne. Deuxièmement, c'est le dernier numéro à se présenter avec la mise en page actuelle.

En septembre 1983, lors de son assemblée annuelle, le Conseil d'administration a adopté une résolution visant à restreindre la distribution du *Journal* aux membres seulement. Aussi, à compter de février, le *Journal* constituera-t-il un autre service essentiel que l'ADC rend à ses membres. Tout dentiste canadien qui voudra continuer à le recevoir et à se tenir au courant des dernières nouvelles scientifiques et de ce qui se passe dans l'Association, devra, si ce n'est déjà fait, se joindre à l'ADC.

Quant à ceux qui se diront: "Je ne recevrai plus le *Journal,* et après?" ils auront peut-être des surprises en février.

Mettant à profit les suggestions que vous nous avez faites lors du sondage sur le *Journal,* l'ADC a décidé d'apporter à la revue des modifications esthétiques et internes majeures. Bien qu'on en soit encore à l'état de planification, il est certain que le *Journal* tirera parti des suggestions faites par les lecteurs.

La principale modification dans la présentation aura trait à la partie française du *Journal.* À compter de février, seuls les membres qui indiqueront que la langue de leur choix est le français recevront une partie contenant les nouvelles, les actualités et les rapports de l'Association en français. Ceux qui indiqueront qu'ils préfèrent l'anglais recevront cette partie dans cette langue.

Pour les uns comme pour les autres, la deuxième partie de la revue comprendra des articles scientifiques, cliniques ou autres qui seront publiés dans la langue où ils auront été écrits, mais accompagnés d'un sommaire dans l'autre langue. Le *Journal* disposera donc de plus d'espace pour les articles et les nouvelles scientifiques ou non.

En changeant la présentation du *Journal de l'ADC,* on se propose de moderniser la revue qui compte déjà 35 ans d'existence et la mettre au goût du jour. On veut qu'elle réponde aux normes les plus élevées, qu'elles contiennent les meilleurs articles scientifiques, des rapports actuels et des nouvelles d'intérêt national et régional. Bref, on veut qu'elle présente ce que le Canada a de mieux à offrir aux membres de l'ADC.

La rédaction désire que le *Journal* soit le meilleur du genre sur le marché, répondant ainsi à la promesse faite par l'ADC de fournir aux dentistes canadiens les meilleurs services possible.

À compter de février 1984, le *Journal de l'ADC* fera peau neuve et deviendra certes l'un des meilleurs services que l'ADC offre à ses membres.

Surveillez bien sa parution.

La rédactrice suppléante,
Carolyn Hackland

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*Rondeau PL, Yeung E, Nelson P: Ibuprofen (Motrin) – An Effective Analgesic in Dental Surgery Pain, J Cdn Dent Assoc 1980

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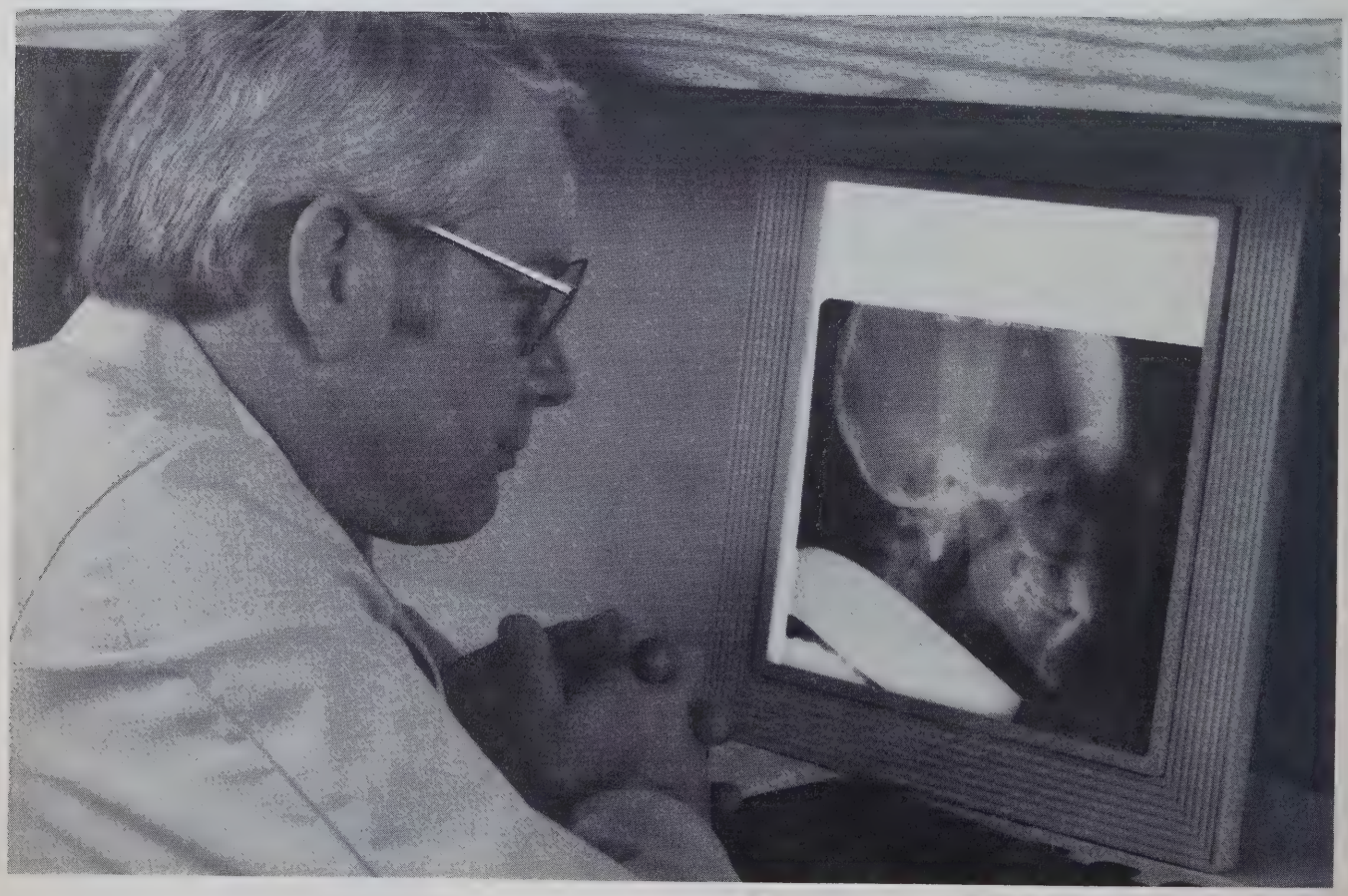

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Continuing Education not all there is to good dentistry

I thoroughly enjoyed Dr. Sparow's September editorial treatise on continuing education. However, when will the dental profession stop deluding themselves and recognize the glaring sparkler of reality that the practice of good dentistry depends more on effort and desire, rather than skill and knowledge. Or to put and syllogize it in the words of Thomas Edison, when asked what the requisites were for success, he replied, "They must appreciate that success comes from at most ten percent innovation and from at least ninety percent perspiration".

When one only considers that we recruit only the finest students with the finest minds and the highest I.Q.s and the greatest digital dexterity. We support them with the best schools, the most modern equipment and the most qualified teachers. After graduation their up-to-date knowledge is mandated by due process of having their license renewal contingent on at least thirty hours per year of continuing education. And yet, the general level of excellence leaves very much to be desired.

Certainly one does benefit from the taking of continuing education. It is a marvellous reminder of some forgotten dental truths as well as teaching us new approaches and perspectives. However, if one were to have graduated in the 1950s or 1940s or even earlier, and applied now *only* the basic knowledge that was available then with diligence and sincere effort, I believe that in 1983 any of us would be proud of the results of his or her professional efforts.

What is the answer to this befuddling conundrum? I resolve that good dentistry takes time. Much time. Time is money. Big dollars and big mortgages clash with good dentistry. Let's put that in our dental bonnets!

Sincerely,

Dr. Jack C. Friedman
Vancouver, B.C.

All Canadian Dental Schools Represented at Student Clinician Program

Canada's 10 dental schools were represented at the 13th CDA/Dentsply Student Clinician Program, held in conjunction with the national convention in Vancouver September 25-28. Once again, the program was sponsored by Dentsply Canada Ltd. through a special grant made to the Canadian Fund for Dental Education.

Those students who placed first in their school's spring clinic program were those chosen to represent their schools at the national convention.

The students who participated and their table clinics were: Eric Beaton of Dalhousie University — "Candidia: Clinical and Experimental"; Sam Carson, University of Manitoba — "The Dental Practitioner's Role in the Identification of Child Abuse"; André Chartrand and Pierre Talbot, University of Montreal — "The Dentist and His Back"; University of British Columbia's Albert Cheung — "Twist Band Amalgam Matrix"; Daniel Cullum of the University of Alberta — "Pulp Response after Treatment of Direct Exposures with Calcitonin"; Anne-Marie Geoffrey, Laval University — "Compared Retention of Two Pins Systems"; University of Saskatchewan's Perry Kurz and Doug Brothwell — "Inerocclusal Recording Materials"; Glenn Morawetz, University of Western Ontario — "Hepatitis B: Are Dentists Finally Safe?"; and Robert Simonsky, University of Toronto — "Fluoride Uptake from Dental Cements".

Mr. Burton Borgelt, President and Chief Executive Officer of Dentsply International, hosted a reception and dinner honoring the participating student clinicians on September 26. Among the special guests at the reception were Dr. William Thompson, Past President of CDA, Dr. David Peters and Dr. James Guest, Chairman and Past Chairman of the Canadian Fund for Dental Education, Dr. Thorsten Aggeryd, President of the Federation Dentaire Internationale, and Dr. Brenda Harman, President of the Alumni Association of Student Clinicians for the American Dental Association.

Participants and sponsors of the CDA/Dentsply Student Clinician Program gathered for this photograph following the Dentsply Canada Reception and Dinner honoring the students.

CDA Member Services

The Registered Retirement Savings Plan: A cornerstone of retirement income security

Kenneth T. Ransby, FSA, FCIA

As part of its service to members the Canadian Dental Association sponsors a Registered Retirement Savings Plan, which is available to CDA members only. This plan is administered by the Canadian Dental Service Plans Inc. (CDSPI).

This article is the fourth in a series of membership articles, detailing benefits available to Canadian dentists who have a membership in the Canadian Dental Association.

Financial security is of concern to Canadians in all walks of life. Most of us dream of acquiring this financial security by the "windfall method" — such as by winning a million dollar lottery or by turning simple inventions or modest investments into huge profits. The blunt fact remains, however, that for the vast majority of the population, financial security may only be gained by hard work and a disciplined approach to saving.

For professionals such as dentists, generating sufficient additional funds to enjoy luxuries such as vacations in the south, a new car, etc., is often not too difficult a task. With careful budgeting, the continuation of a steady, above-average income will usually ensure that such funds are available. However, saving sufficient funds to ensure a continuation of a comfortable lifestyle in retirement is a much more difficult matter; ensuring this kind of security requires a long term financial commitment on the part of the individual.

To illustrate the extent of the financial commitment involved in achieving retirement income security, consider a dentist, aged 40, who is currently earning $50,000 net after business expenses but before deductions for income tax. Assuming this dentist's income increases by 7% per year and the dentist retires at age 65, it should be realized that the dentist must save approximately $1,000,000 by that time in order to provide for a retirement income that will ensure a reasonable standard of living in the retirement years.

$1,000,000 is a staggering sum indeed, especially since statutory Government benefits (Canada Pension Plan and Old Age Security) that would be payable to this retired dentist have been taken into account. Also, these benefits are assumed to be payable at a much higher dollar level than they are in 1984 (which is about $7,800 per year presently, for the two plans combined).

The Government programs are currently designed to provide only a subsistence level of retirement income. Moreover, despite the numerous pension studies that have been conducted by the Federal and Provincial Governments, business and labour groups, it remains highly unlikely that our Governments will augment such programs in future so as to provide more than a modest income level to pensioners in Canada. It is clear that the onus for bridging the gap between this modest income level and full financial security for above-average income earners rests squarely with employers through private pension plans and with individuals through personal saving.

Dentists and other self-employed individuals, of course, do not have access to employer-sponsored pension plans. They do have the opportunity, however, of making significant tax-deductible contributions to Registered Retirement Savings Plans in order to accumulate the funds that will be required to provide financial security in their retirement years.

Under the present Canadian Income Tax Act, an individual who is not a member of a registered pension plan is allowed to make tax-deductible contributions to a RRSP, to a maximum of $5,500 (or 20 per cent of earned income, if less) in any taxation year. It is hoped that these tax-deductible limits will be increased over time — and sooner rather than later (the tax-deductible limit was last increased from $4,000 in 1976). Otherwise, the opportunity to generate adequate retirement income through the RRSP may be severely limited in the future.

It is also permissible to make tax-deductible contributions to a RRSP registered in the name of your spouse. This may be of advantage when the funds are received after retirement, since taxes would be deducted on RRSP-generated benefits on the basis of the spouse's effective tax rate, which is often less than the rate applicable to the retired dentist. It should be emphasized, however, that such contributions on behalf of the spouse do not increase the contributor's overall tax-deductible RRSP limit.

Most dentists have already accepted the value of making contributions to Registered Retirement Savings Plans. Data published by Revenue Canada reveals that the average RRSP contribution by self-employed dentists was approximately $3,700 in the 1980 taxation year. For those individuals who have decided to defer making RRSP contributions until a later time, the following chart should provide some insight into the incremental rewards of starting contributions at an early age:

Notice that in the total accumulations to age 65, the portion represented by "investment earnings" dramatically increases for the individual who commences contributions at a younger age. For example, using the figures under the column "investment earnings = 8% per year", accumulated investment earnings for the entrant at

age 50 are less than the total capital invested, whereas for the entrant at age 30 the accumulated investment earnings are about 4 times the total capital invested.

It is also apparent, from these illustrations, that increasing the annual investment return over the accumulation period has a major impact on total fund accumulations. This factor underlines the importance of investing your RRSP contributions in the most effective manner, i.e.

- selecting RRSP investments which will generate high investment returns while maintaining an appropriate level of risk for your personal circumstances, and
- selecting a RRSP investment vehicle which involves relatively low investment management expenses, commissions and other administrative charges.

RRSP investment vehicles are offered by a variety of organizations, such as banks, trust companies, insurance companies and credit unions. The Canadian Dental Association, as a membership service, also has established a Registered Retirement Savings Plan to which approximately 1,200 dentists (including a number of their spouses) are making contributions. The CDA Plan is administered by Canadian Dental Service Plans Inc. (CDSPI).

Depending upon the institution involved, various types of investment accounts may be available for RRSP contribution purposes:

Money market funds, investing in treasury bills, certificates of deposit in chartered banks and corporate money market instruments;

Fixed income funds, investing in first mortgages and Government and corporate bonds;

Guaranteed funds, investing in trust company Guaranteed Investment Certificates (GIC's);

Common stock funds, investing primarily in Canadian common stocks;

Balanced or diversified funds, investing in a diversified portfolio of fixed income and equity investments.

It is important to realize that not all of these vehicles are offered by each RRSP investment organization. In addition, the expenses deducted by the RRSP investment organizations vary widely. For example, some funds deduct sales commissions and other "front-end loadings" and may also levy termination charges, whereas others charge for their services by making a monthly charge based on the market value of your investments, or by lowering the net interest credited on fixed income investments.

The RRSP investor therefore should carefully consider the investment options that are available on the market — both in terms of the risk/return expectations associated with alternative types of investments (e.g. money market funds vs. equities), and also in terms of the investment management expenses and other charges involved.

The CDA RRSP offers four investment fund options (money market, fixed income, common stock and balanced), and the member can contribute to any one or a combination of these funds in order to suit personal preferences. Account balances are charged with a monthly management fee related to the market value of investments, but there are no front end loadings or termination fees.

It is also possible to establish a self-administered RRSP, which leaves investment choices entirely up to the individual investor (subject to Federal Government investment regulations applicable to Registered Retirement Savings Plans). However, this alternative should only be considered if the investor has the expertise and the time — or employs advisors who do — to adopt appropriate investment strategies and to monitor the RRSP program.

In summary, I believe that the Registered Retirement Savings Plan is a cornerstone of retirement income security for higher-income self-employed individuals such as dentists. To obtain the greatest advantage from RRSP contributions, you should consider the following critical factors:

Start contributions at the youngest age that is economically possible;

Make the highest possible contributions within the tax-deductible limits of the Income Tax Act;

Consider the numerous investment options that are available and tailor your investments to your individual risk/return expectations.

Accumulation of $1,000 Annual RRSP Contributions

To Age 65 From:	Investment Earnings = 6% Per Year	Investment Earnings = 8% Per Year	Investment Earnings = 10% Per Year
Age 50			
— RRSP Contributions	$ 15,000	$ 15,000	$ 15,000
— Investment Earnings	8,276	12,152	16,772
—Total Accumulation	**23,276**	**27,152**	**31,772**
Age 40			
— RRSP Contributions	$ 25,000	$ 25,000	$ 25,000
— Investment Earnings	29,865	48,106	73,347
—Total Accumulation	**54,865**	**73,106**	**98,347**
Age 30			
— RRSP Contributions	$ 35,000	$ 35,000	$ 35,000
— Investment Earnings	76,435	137,317	236,024
—Total Accumulation	**111,435**	**172,317**	**271,024**

Kenneth Ransby is an actuary in the Toronto office of Towers, Perrin, Forster & Crosby (TPF&C), an international management consulting firm. TPF&C has provided consulting advice to the Canadian Dental Association with respect to the CDA-sponsored Registered Retirement Savings Plan, which is administered by Canadian Dental Service Plans Inc.

Guidelines for the Control of Radiation in the Dental Office

At the CDA Board of Governor's meeting, held in Vancouver, B.C. in September 1983, the following guidelines for the control of radiation in dental offices were adopted.

Introduction:

Since the Federal Government maintains jurisdiction over the standards of construction and functioning of x-ray equipment, while its installation, registration and office design criteria for its use are promulgated by provincial legislatures, any guidelines developed by C.D.A. for the use of x-radiation in the dental office should not deal specifically with legislative areas but rather set forth standards of practice for dentists which reflect and demand professional competence and judgement.

General Guidelines

1. All x-ray equipment should conform to the Federal requirements of the Radiation Emitting Devices Act.
2. All equipment installation and room design criteria, e.g. with respect to wall insulation, (lead lining or equivalent) should be in conformance with Provincial regulations. In the absence of existing Provincial regulations in any particular jurisdiction, the dentist should refer to Health & Welfare Canada Safety Code 22, National Council on Radiation Protection & Measurements, Report 35, or the ADA Recommendations on Radiographic Practices, 1981.
3. All operators should possess an adequate knowledge of radiation physics, radiation hazards and be able to produce consistent radiographs of diagnostic quality with a minimum of overall radiation exposure.
4. It is highly desirable that a regular inspection programme of x-ray equipment (usually 3 years) be carried out on a constant basis. It is recommended that a programme to ensure consistently high quality of radiographic films by monitoring processing conditions be established.
5. It is highly desirable that the operator/owner request a qualified technician to perform a regular inspection of the x-ray equipment to assess radiation output and "normalize" the x-ray taking system; that is, ensure that existing exposure and processing conditions are producing radiographs within an acceptable exposure range.
6. An exposure guideline chart should be fixed near the x-ray timer indicating kV, mA and the exposure time to be used for children, adults and edentulous patients.
7. View exposed radiographic film under optimal conditions. A variable intensity viewer is desirable. Extraneous light should be minimized.
8. It is highly desirable that dentists enroll in continuing education in the many aspects of diagnostic radiology, diagnostic technology and radioprotection.

Protection to Operators:

1. All operators should be licensed or certified according to a standard recognized by the provincial dental licensing body.
2. Any female operator who suspects or knows she is pregnant must be assured that for the duration of her pregnancy she will experience minimum radiation exposure. It should be noted here that the developing foetus is particularly sensitive to x-ray damage.

Operators in Training

1. Personnel here must work under the supervision of a licensed dentist.
2. The minimum age of operators in training should be ideally 16 years of age but notwithstanding the guideline, any student under the age of 16 years shall not receive a dose to the gonads and/or bone marrow in excess of 500 millirems in any one year.
3. Personnel must not be exposed to the primary beam. Deliberate exposure of an individual for training purposes must not be carried out.

General Guidelines for Office Personnel:

1. A room must not be used for more than one x-ray procedure simultaneously.
2. No person, whose presence is not essential must be in the room during an exposure.
3. If the operator must be in the room with the patient during exposure, then protective clothing must be worn.
4. The dental film should be fixed in position using holding device where necessary.
5. If parents or escorts are called to assist, then protective clothing should be worn.
6. The x-ray housing must not be held by the hand during operation.
7. All office personnel working with x-ray equipment should wear personnel dosimeters.
8. Dosimeters should be worn under the protective lead apron if the operator is in the room with the patient during exposure.
9. In situations where excessive radiation doses (greater than 25 per cent of maximum permissible) are received by any one person, then

remedial steps must be taken to improve techniques and protective measures.

Guidelines to Protect the Patient:

The risk to the individual patient from a single dental x-ray is very low. However, the risk to a population is increased by increasing the frequency of x-ray examinations and by increasing the number of persons x-rayed. Every effort should be made to minimize the amount of radiation required necessary to diagnose the situation.

1. The prescription of an x-ray examination by a licensed dentist should only be based on a clinical evaluation and be for the purpose of obtaining information not readily available from other sources.
2. The justification for taking dental radiographs should be determined by a perceived need to obtain specific information which could contribute to a correct diagnosis or prevention rather than utilizing the concept of the routine periodic examination with or without having seen the patient beforehand.
3. One should determine if any recent x-ray films are available and see if those are adequate.
4. When a patient is transferred from one dentist to another and diagnostic information is sought which might have been available on previous radiographs, then the referred dentist should attempt to obtain such radiographs rather than routinely order a new prescription of radiographs.
5. The number of radiographs required should be kept to a minimum, consistent with obtaining the required information.
6. Operators should select films of a speed and quality that will permit the production of roentgenograms of an acceptable diagnostic quality with minimum exposure of the patient to radiation.
7. The quality of radiographs should be monitored routinely to ensure that they satisfy diagnostic requirements.
8. Repeat films should not be taken if the radiograph is not of the "best" quality but sufficient diagnostic information is contained within.
9. A lead apron and thyroid collar should be used for the taking of intra-oral films.
10. The x-ray beam should be well-collimated so that it irradiates only the minimum area necessary for the examination. Under no circumstances should it be in excess of 7 cm. (2-2/4") at the level of the skin.

X-Rays and the Pregnant Patient

1. Elective procedures should be deferred until after pregnancy.
2. Where radiographs are necessary, maximum safeguards should be taken, consistent with current accepted techniques.

Conclusion:

If all the above guidelines are followed then patients can be assured that they are receiving a level of radiation exposure that is at the safest level possible. The frequency of the making of x-ray films is a matter of clinical judgement. The selection of equipment and techniques used is the decision of the dentist. However, the ultimate aim is to reduce the level of x-radiation eminating from the dental office and to this end there has evolved and been accepted a principle stating that an x-ray dose that can be reduced without loss of critical diagnostic information and without too much expense or inconvenience, should be reduced no matter how low it is and that a dose that can be avoided altogether without grave consequences, should be avoided. That is the **ALARA** Principle. (As Low As Reasonably Archievable).

CDA Retirement Savings Plan

Unit values of the Canadian Dental Association's Retirement Savings Plan stood as follows on November 30, 1983.

Common Stock Fund	$78.01933
Fixed Income Fund	$37.71952
Guaranteed Fund	$27.29416
Balanced Fund	$15.45642

Total assets (market value) of the plan were $38,443,579.

The previous month's figures, as of October 31 1983, stood as follows:

Common Stock Fund	$71.44569
Fixed Income Fund	$37.39415
Guaranteed Fund	$27.08490
Balanced Fund	$15.19816

Total assets (market value) of the plan were $37,227,863.

For further information write to: Canadian Dental Service Plans Inc., Ste. 600, 2 Lansing Square, Willowdale, Ontario M2J 4Z3 or call the central information services of CDSPI at 1-800-268-5418 (toll free number for Western Canada, Atlantic Canada and Ontario for Code 807 only, 1-800-268-3411 (toll free number for Quebec and Ontario except Code 807), and 497-7117 (Metro Toronto area).

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Programs co-sponsored by your national and provincial dental associations and administered by ***Canadian Dental Service Plans Inc.***, 2 Lansing Square, Suite 600, Willowdale, Ontario M2J 4Z3.

New Public Education Materials / Nouveau matériel d'éducation du public

No. 1

Are You Missing a Few Teeth? — explains why missing teeth should be replaced and how they are replaced with either a removable partial denture or a fixed partial denture

Cost to: CDA Members **$18/100**
Non-Members **$25/100**

N^O 13

Vous manque-t-il des dents? — explique pourquoi on doit remplacer les dents qui manquent et comment on les remplace, au moyen de prothèses partiellement amovibles ou de prothèses partielles ou ponts amovibles.

Coût aux: Membres de l'ADC **$18-100**
Non-Membres **$25-100**

No. 39

Save that Tooth — describes how the pulp of a tooth can become inflamed and/or infected and how it is treated. The pamphlet explains root canal treatment

Cost to: CDA Members **$ 8/100**
Non-Members **$12/100**

N^O 40

Sauvez vos dents — décrit comment la pulpe de la dent s'enflamme et/ou s'infecte, et comment on la soigne. Ce pamphlet explique le traitement de canal.

Coût aux: Membres de l'ADC **$ 8-100**
Non-Membres **$12-100**

No. 12

Do You Need Complete Dentures? — explains problems associated with total tooth loss. Readers are provided with information on how dentures are made and how to adjust and clean their dentures.

Cost to: CDA Members **$18/100**
Non-Members **$25/100**

N^O 23

Vous faut-il des dentiers? — explique les problèmes relatifs à la perte de toutes les dents. Fournit au lecteur des renseignements la fabrication, l'ajustement et l'hygiène des dentiers.

Coût aux: Membres de l'ADC **$18-100**
Non-Membres **$25-100**

No. 47

Do It Yourself Oral Hygiene — a colourful pamphlet which, when opened, can be displayed as a poster. It pictorally explains the basic technique for daily plaque removal.

Cost to: CDA Members **$18/100**
Non-Members **$25/100**

N^O 49

Pratiques d'hygiène pour garder une bouche saine — pamphlet coloré qui, ouvert, peut servir d'affice. Explique visuellement la technique élémentaire d'enlèvement de la plaque quotidienne.

Coût aux: Membres de l'ADC **$18-100**
Non-Membres **$25-100**

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ust off the press. These posters were designed to provide your patients with a dental awareness message while in your office.

uste imprimées. Ces affiches doivent faire prendre conscience de leurs dents aux patients dans votre salle d'attente.

ost to: CDA Members $1.00 each **Coût aux:** Membres de l'ADC $1.00 chaque
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Poster No. 1

Poster No. 2

Poster No. 3

Affiche N^O 1

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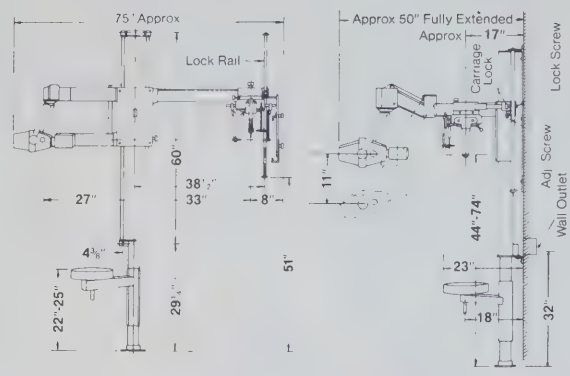

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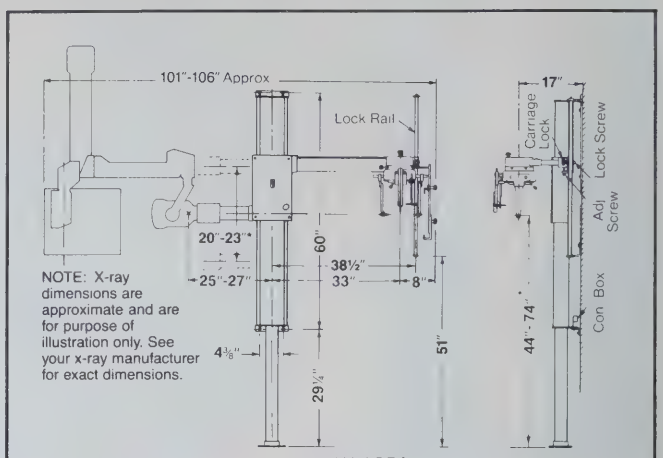

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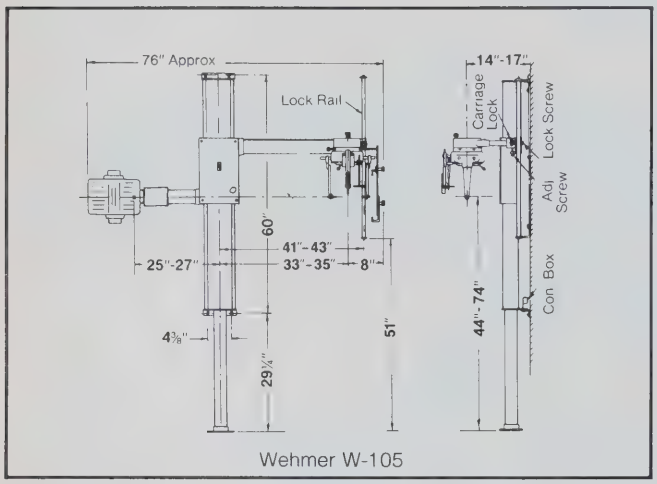

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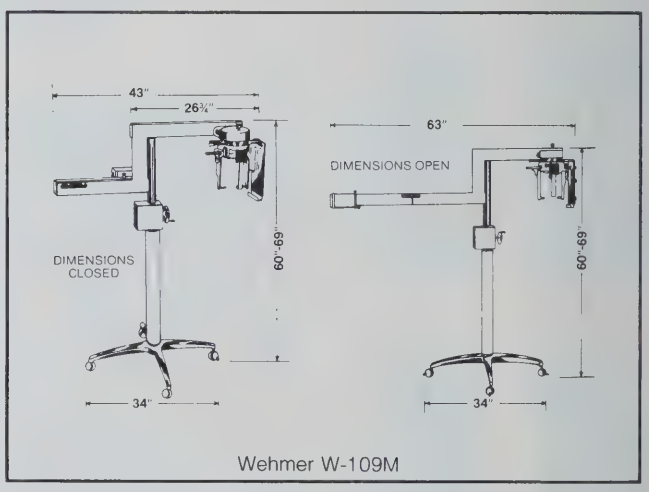

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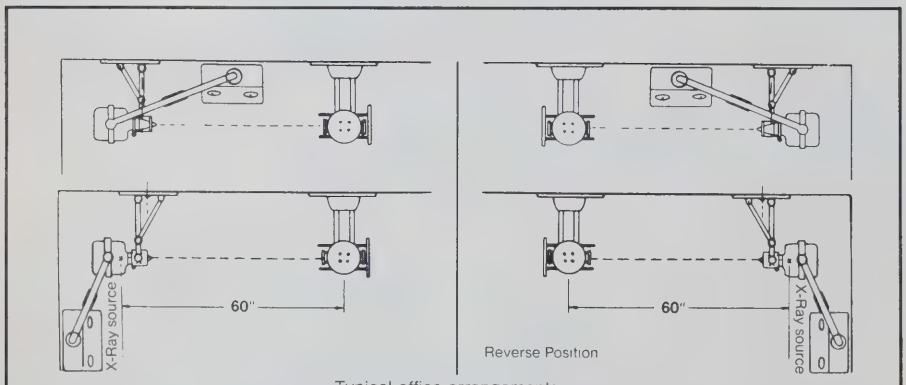

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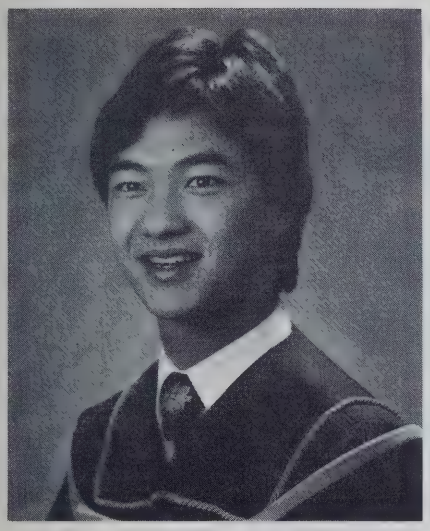
Canadian Student's Essay Wins U.S. Dentistry Award



Keenman Feng

Keenman Feng, a dental student at the University of British Columbia Faculty of Dentistry in Vancouver, was recently the recipient of the third place Bremner Award of the American Academy of History of Dentistry.

The awards are given to writers of essays on the history of dentistry, and Mr. Feng won his prize for his essay entitled "Dentistry's Symbol." The winning essay is presented by the Journal for the enjoyment of our readers.

Last year, the writer, like many other dentistry students across North America, bought a shirt with the Dentistry crest on it. This crest generated many questions from interested persons who saw it and, being unable to answer these questions, some research provided the following information.

There are two distinct schools of thought concerning the origination of the symbol associated with Dentistry. The symbol used by the Canadian Dental Association consists of a staff around which is entwined a serpent surrounded by a triangle and a circle. The staff and serpent is called the staff of Aesculapius, the triangle is the Greek letter delta and the circle is the Greek letter omicron. The symbol chosen by the American Dental Association is similar but in the background and at the base of the staff are found thirty-two leaves and twenty berries. The principal colour of the symbol is usually lilac which is the official academic colour for Dentistry.

The second symbol, used by the United States Army and the United States Department of Public Health is somewhat similar but there are two serpents which are oppositely twined around the wand of Thoth-Hermes replacing the Aesculapian staff. Both the staff of Aesculapius and the wand of Hermes are known as the Caduceus. However Thoth-Hermes is of Egyptian origin while Aesculapius is of Greek origin.

Aesculapius was born on the Island of Delos which is said to have been raised from the Aegean Sea by Zeus, the supreme god. Aesculapius' father was Apollo the son of Zeus and Apollo became the God of Health. He passed on his knowledge of medicine to Chiron, the Centaur who, in turn, passed on these guarded medical secrets to Aesculapius.

Aesculapius practiced his medicine/magic in the temples. The sick came to the temples, purified themselves by bathing, made a sacrifice to the Gods and then lay down to sleep in the corridors. During the night, priests gave advice and provided treatment which was supposed to cure the patients by morning. During this temple sleep, large non-poisonous yellow snakes of the species Colubert Longissimus would lick the patients' wounds. They were especially effective in treating infected eyes and were used as well to keep down the mouse population in the temples. The use of these snakes in this manner forms the basis for the Greek use of the Aesculapian staff and the serpent upon the staff has been accepted generally as the symbol for the art of medicine.

The relationship of the serpent to the healing arts can be seen in use by many civilizations. There was an asp on the crown of Queen Isis, a fire serpent on the signpost of Assyrian physicians, rattlesnakes on hieroglyphics in Mexico and Brazil and the Ophidian on the magic staffs of Apollo, Aesculapius and Hippocrates. The serpent is the symbol of the occult life principle. It signifies latent healing power and knowledge that renders the possessor a divine being — a force so powerful for good or evil that basic knowledge was jealously guarded. This knowledge was confined to a special caste of priests or physicians and was handed down only to sons or to those few individuals who were able to pass an initiation test. According to the law recorded by Hippocrates "the holy word may only be revealed to the initiated".

The staff in the second symbol is a little more complicated. Although Thoth-Hermes was of Egyptian origin his Greek counterpart was Hermes and his Roman counterpart was Mercury. Consequently it is often called the staff of Hermes or the staff of Mercury. As mentioned previously it has two entwined serpents along its length and a pair of outstretched wings as its head. There is some evidence of this sign in Babylonian culture and it can be seen on Greek vases dating back to the sixth century B.C. It was considered to be an emblem of the God of Spring and Fertility who was in turn the messenger of the Mother Goddess and the Sun God.

Later, Hermes became the Messenger God and the God of Peace. The

staff on his caduceus was originally a shephard's staff made from a forked olive branch to which were attached two white ribbons. To this day both the olive branch and the white ribbons (flags) are symbols of peace.

Hermes, like Aesculapius, was a son of Zeus but they were only half-brothers and in fact, Hermes married Hygeia, the daughter of Aesculapius. He does not seem to have had much to do with medicine although part of his duties involved conducting the dead to their subterranean resting places. Hermes' Roman counterpart was Mercury who was regarded as the God of Trade and Commerce. This association has continued to this day as the Caduceus appears on the buildings of the United States Department of Commerce and the United States Post Office.

Of the Caduceus of Greek origin it can be said, then, that the serpent represents knowledge and healing. The staff, which varies sometimes from the size of a walking stick to that of an arm crutch, signifies the help that the practitioner renders. Sometimes the staff was gnarled and knotted which led to the saying "Aesculapius' staff was as knotty as his craft" indicating the knotty problems often faced in treatment.

So much for the Caduceus. What do the other parts of the Dentistry symbol represent?

The Greek letter delta stands for Dentistry and the Greek letter omicron stands for odont or tooth. On the American Dental Association symbol the thirty-two leaves represent the thirty-two permanent teeth and the twenty berries represent the twenty primary teeth. Put them all together and a very esthetic, historically significant symbol for Dentistry results.

From the available evidence one can conclude that the symbol of Dentistry has its origin in Greek mythology rather than Egyptian. The staff of Aesculapius is more appropriately used in the symbol since it is related to the healing arts whereas the wand of Hermes (Mercury) is related to Trade and Commerce. Consequently, both the Canadian and American Dental Associations would appear to have adopted the appropriate symbol.

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CDA and CIDA and New Brunswick, helping to set up dental care program in St. Kitts/Nevis

The CDA was given a grant by the Canadian International Development Agency (CIDA) to set up an educational and preventive dentistry program for elementary school children on the islands of St. Kitts/Nevis in the Caribbean.

The program is largely funded by the Canadian International Development Agency (CIDA) which gave the Canadian Dental Association $24,000 to get the scheme underway. Under the program, elementary school children will be educated on the practices of good oral hygiene and given a fluoride mouthrinse through the school program.

Following CIDA's contribution, the Canadian Dental Association approached the New Brunswick Department of Health to assist in the implementation of the program. New Brunswick has a dental health and fluoride mouthrinse program for elementary school children that, recently, has begun to show long term benefits and is attracting national attention. Since the program in New Brunswick has been so successful, both CIDA and CDA wanted the expertise of that province, in the person of Dr. John Blackmer, Director of Dental Health Services for the New Brunswick Department of Health to be involved in the project.

Dr. John Blackmer (L) is shown greeting Health Minister Sydney Morris, is St Kitts/Nevis, following a meeting on the oral health education program.

Mary Pelletier, President of the Canadian Dental Hygienists' Association is shown demonstrating some of the materials and the fluoride mouthrinses being used in the CDA sponsored program.

The program got underway in St Kitts/Nevis, when in April 1983, Dr. Blackmer visited the islands to meet with the Minister of Health and the government dentist. A plan was then designed which was implemented in the fall of 1983, under the supervision of both the dental hygienist at the New Brunswick Health Department and the president of the Canadian Dental Hygienists Association.

According to Dr. Blackmer, the minister of Health for St. Kitts/Nevis, Sydney Morris, is placing the emphasis of the program on preventive measures.

"His aim is primary prevention rather than secondary treatment, exactly the aim of our New Brunswick mouthrinse program," said Dr. Blackmer.

(L-R) Mr. Hector, Permenant Secretary of Health, St Kitts/Nevis; Dr. Julian Mitchell; Barbara Edwards, Hygienist with the St Kitts/Nevis Ministry of Health; Dr. John Blackmer; Mary Pelletier; Health Minister Sydney Morris.

NDEB Wins Federal Court of Appeal Case

In 1983, for the first time in its 31-year history, The National Dental Examining Board of Canada was challenged by an unsuccessful candidate in the Federal Court of Appeal.

The candidate challenged the following fundamental practices of the Board:

1. *The Board's right to determine certification requirements* and to utilize both examinations and the accreditation process as a means of certification.
2. *The Appeal Mechanism of the Board.* The candidate had requested a hearing with her examiners present. The Court ruled that the Board's appeal mechanism consisting of a written submission was adequate, particularly since the candidate was eligible to repeat the examination in question.
3. *Disclosure:* It was submitted that the Board had failed to exercise the principle of natural justice by failing to provide adequate disclosure and reasons for failure. According to Dr. Gundega Kravis, Registrar of the NDEB, reasons for failure are provided to all candidates upon request.
4. *Credibility of the Board's examiners.* The Court considered this issue to be one of expert witness.
5. *Canadian Charter of Rights and Freedoms.* Lastly the candidate challenged the NDEB under Section (6) (2) (b) of the Charter of Rights and Freedoms which states that «Every citizen of Canada and every person who has the status of permanent resident of Canada has the right to pursue the gaining of a livelihood in any province.» The Board's counsel refuted this by using precedents, particularly the ruling in a B.C. case which stated that a person has the right to pursue his chosen profession only after he has qualified and registered with the appropriate licensing authority.

The judgement of the Court was in the favour of the National Dental Examining Board. The Court ruled that the applicant had not shown any basis upon which the Court would be justified in overruling the decision of the NDEB (to fail the candidate in the clinical examination).

Brian Henderson Joins CDA as Director of Accreditation

by Heather Lang-Runtz

The Canadian Dental Association has a new Director of Accreditation.

Mr. Brian J. Henderson, B.A., M.Ed., assumed his position on December 1, 1983, replacing Dr. Victor Chatwin, who retired from the Association at the end of the year after five years of service.

A graduate of both Queen's and Ottawa universities, Mr. Henderson brings to his position a successful background in the accreditation of educational programs. He was formerly with the Canadian Medical Association as Co-ordinator, Allied Medical Education and Accreditation, where he was responsible for several national conjoint accreditation committees, involving programs for various medical disciplines including medical laboratory technologists and ultrasound technologists.

Brian Henderson

Before joining the CMA, Mr. Henderson worked for Ottawa's Algonquin College: he was supervisor of the English faculty, director of social sciences, chairman of the General Arts and Sciences Department, and dean, Health Sciences Division.

An active member of his community, Mr. Henderson is presently a member of the Board of Trustees of the Centre Hospitalier Elizabeth Bruyere.

CFDE Invites Applications for Fellowships

The Canadian Fund for Dental Education (CFDE) is now accepting applications for fellowships in two important areas.

One fellowship being awarded is a teacher/researcher fellowship, for the 1984-85 academic year. Candidates must be Canadian citizens or landed immigrants, who have completed an undergraduate course in dentistry, dental hygiene or a program in science and be eligible for admission to a graduate school.

Applicants must also declare their firm intention to become a teacher or researcher in a Canadian faculty of dentistry or dental auxiliary training program. Preference will be given to applicants who will return to a full-time teaching/research position. The number of fellowships to be awarded and their value will be determined.

CFDE is also offering a fellowship for an existant university dental teacher. This award, sponsored by Warner-Lambert Canada Inc., is valued at $2,500. Candidates for this fellowship must be full-time members of the teaching staff at one of Canada's dental schools, with a minimum of five years teaching experience.

The proposed program under this fellowship must be well defined and organized to ensure benefit to the individual and his/her dental school. Minimum length for a proposed program is one month, although shorter programs may be considered.

The deadline for filing applications for both fellowship programs is March 1, 1984. More information may be obtained from CFDE, 234 ST. George St., Suite 202, Toronto, Ont., M5R 2P1, 416-928-0484.

Obituaries / Nécrologies

BEATTIE, J.P.: Dr. Beattie was born in Regina Saskatchewan in 1917. He graduated from the University of Toronto in 1941 and served with the Royal Canadian Dental Corps during WWII. Active in the Canadian Dental Association, he also served as president of the Winnipeg, Western Canada, and Manitoba Dental Associations. He was a Fellow of the International College of Dentists.

BELL, G.W.: Dr Bell, a resident of Drumbo, Ontario, graduated from the Royal College of Dental Surgeons, School of Dentistry, in Toronto, in 1922.

CASTILLOUX, G.: Né en 1948 et diplômé de l'Université Laval en 1975, le Dr Castilloux est décédé accidentellement il y a peu de temps.

COHEN, A: After graduating from Dalhousie University's School of Dentistry in 1935, Dr. Cohen practised in Glace Bay, N.S. A member of both the Nova Scotia Dental Association and CDA, he served with the dental corps during the Second World War.

DARTS, G.C.: A CDA Life Member, Dr. Darts practiced in Vancouver, B.C. for more than 46 years. He was born in Nelson, B.C. in 1899, and graduated in 1925 from the University of Toronto.

McCARTNEY, M.G.: A graduate of the University of Toronto in 1935, Dr. McCartney was born in 1922. He resided in Lakefield, Ontario at the time of his death.

PALMER, A.M.: Born in Perth, Ontario in 1894, Dr. Palmer was a former President of the Alberta Dental Association. He graduated from the Royal College of Dental Surgeons, School of Dentistry at Toronto, in 1920.

SHEPHERD, F.H.: Dr. Shepherd, a Life Member of the CDA, was born in 1902. He graduated from the University of Toronto in 1925, and was a resident of Toronto at the time of his death.

COVER STORY

This month's cover shows the skyline of Montreal, one of Canada's largest metropolitain centres and the setting for the conjoint convention of the CDA and the ODQ, "Les Journées Dentaires."

The convention, taking place April 8-12, 1984, will have something for every taste, all with that special flavour of Montreal.

Montreal's new Palais du Congrès is the setting for much of the Convention, with the Queen Elizabeth Hotel, an old and elegant inn, backdrop to much of the convention's social and spouses programs.

The CDA Journal is indebted to the Commission d'initiative et de développement économiques de Montréal, City of Montreal, for this photo.

Clothes Maketh the Person?

By

Jean Cives

What should a dentist and associates wear? This year's fashion is weasel skin or shaved weasel fur in Italy — for models that is. The fall collections from Paris had quite an Arabian look — all burnouses and flowing robes. This style would hardly be suitable for lounging about the Self-Service station in Winnipeg, waiting for Santa Claus to arrive, but could be effective in the front office in Newfoundland as oil reserves are finally piped ashore.

But in your ordinary busy Canadian dental office, what is the fashion? The past has seen disparate styles, my first dentist was an ex-army man from the First World War. I think he regretted its conclusion, and wore a white jacket of the Junker School, complete with clipped moustache, and all about were faded brown photographs of the chaps in puttees (funny things wrapped around the legs, designed to catch mud and possibly prevent trench foot) standing outside tents in France, in Mesopotamia and other unlikely spots for today's dentist. However, this atmosphere caught the style of Dentistry. Caries was identified with the zeal of Baron Von Richthofen sighting Billy Bishop, the probe was placed within this sin, and the patient's reaction judged. By Army procedures, a small scream was a filling, a loud scream was an extraction. Then if you were young or female, a syringe was produced and out of a bottle in front of your very eyes a dose of painkiller was extracted. All very chummy this was; the needle was changed every month, whether it need be, or not. From time to time the assembly was dropped in boiling water with all the other sources of infection. Only the best bugs survived, and only the best patients returned.

When we as a profession went all aseptic in the 60's, it was white tip-to-toe. (I still have a half used pair of white shoes in case I take up cricket.) But this became too hospital and too clinical. What a reaction in the late 60's and 70's. Beads, gold chains, open neck shirts and tota carpet was all the rage among the fellows. The lady dentist was just ordinary in dress — the best from the Bay or some other Boutique, but their hair! Remember the bouffant back-combed bee hives; your average lady dentist always appeared to be hydrocephalic.

The following vignette, written from the lighter side of dental practice, was submitted recently by a past contributor to the Journal, Jean Cives. These will be featured, periodically, as they are submitted for publication, in the future.

But now the 80's, and times are hard. I see a few residual hippies, not clanking with quite so much jewellery, but nevertheless still hip, still just in from the ski slopes or the yacht, and barely able to grow enough hair on the buccal and lingual to swing over the exposed hairworn occlusal — always looking like a negative misbegotten PFM crown with bone and skin appearing as it were on the occlusal surface. Who is deceived?

The main tour de force fashion-wise I wish to report is simply last year's jacket, mildly tattered, the zipper repaired with stapling machine, and the whole ensemble finished with dabs of rubber-base from various exciting impressions. Second to this is the aged dental student jacket. One dentist I know has worn his student outfit since 1968, apart from a checked shirt or two in 1973-74.

What of the other ranks, as my old dentist would have called them? Trousers are in. Thus behinds are in also. There's that poem that goes something like "you look divine as you advance, but darling have you seen yourself retreating?" Unfair of course. But the uniform introduced in Pasteur's day was to show the nurse when she had spots and nasties on her apparel, and now they all wear them home to share the daily dental debris with the whole family.

What do we see in the future? Certainly not shaved weasel fur, not bangles, hairy chests and beads. To be daring, I think we will throw away our health image. No longer track suits to work and the odd aerobic exercise as we wait for the local to take. I see us as artists making these beautiful crowns, applying new treatments to set off those crowns with lovely pink gingiva. In dress we will affect the smock, the sandals and corduroy trousers and wear berets and fedoras. You like it? We could hardly look funnier than we have ever done in the past!

Drug diversion attempts continue

The following article, written for the B.C. Dental Bulletin by Linda J. Brown, BSc(Phr), Communications Co-ordinator of the College of Pharmacists of British Columbia, was thought by Journal staff to be of interest to dental practitioners acrosss Canada. It is reprinted by permission.

The diversion of pharmaceuticals from legitimate channels of distribution to the illicit market is big business. Narcotic analgesics continue to be the drug of choice for non-medical use. Many non-medical drug users are apparently attracted by the predictable quality, the relative ease with which legitimate pharmaceuticals can be obtained, and the lower price (than herion or cocaine, for example).

The current "street" prices of certain drugs illustrate the profit potential for persons who are successful in obtaining a prescription for a drug with a non-medical use potential.

Drug	Street Price (per tablet/ capsule)
Talwin Compound-50	$ 5 - $10
Fiorinal C 1/2	$ 1 - $ 5
Perconet/Percodan	$ 3 - $ 5
Dilaudid	$50 - $80
Demerol	$ 5 - $10

Dentists are Vulnerable

Dental practitioners are vulnerable on several fronts:

Office break-ins and, to a lesser extent, armed robberies. The criminals are often seeking cash as well as drugs and prescription forms.

Theft of prescription forms. Blank forms may be used by the thief to forge a written prescription or to sell for as much as $10 per "sheet" as they are referred to in the street market.

Feigned or cultivated symptoms. Drug abusers have been known to avoid treatment for conditions such as abscess and tooth decay in order to present symptoms to justify the prescription of narcotics.

Multidoctoring. Some drug abusers carefully coordinate visits to dentists, physicians, and pharmacies to avoid arousing suspicion. On more than one occasion, a drug abuser has ben apprehended with a file card system to assist in keeping track of prescribers, pharmacies, prescription numbers and dates.

"Double doctoring" or "multidoctoring" is an offense described in Regulation 3(3) to the Narcotic Control Act of Canada, which states that "a person in whose favour a prescription or a narcotic has been issued shall not seek or receive another prescription or a narcotic from a different practitioner without disclosing to that practitioner particulars of every prescription or narcotic obtained within the previous 30 days." The Bureau of Dangerous Drugs is prepared to investigate cases in which a person has contravened this regulation.

Altered prescriptions. A carelessly written prescription is an invitation to alteration. For example, "10" can easily be transformed to "40", "70", or "100".

You Can Take Steps

(1) Prevent alteration of written prescriptions. Write out quantities. Sign the prescription immediately below the last drug ordered, and line out any blank spaces.

(2) Maintain strong security on personalized prescription pads.

(3) Avoid the use of rubber-stamped or pre-printed prescriptions. Personally write prescriptions in legible script.

(4) Do not pre-sign prescription blanks.

(5) Do not delegate transmittal of verbal prescriptions to your office staff.

(6) Keep drug inventory to a minimum, and store it securely.

(7) Be wary when a patient requests a specific drug.

(8) When a patient acts suspiciously or is unknown to you, prescribe non-narcotic medications.

(9) Develop communication with your local pharmacists. They may be aware of certain activities of a questionable patient which will assist you in making a judgement regarding prescription drug requests.

Additional Support is Available

The College of Pharmacists of British Columbia operates a Telephone Alert System to warn pharmacists of forgeries, stolen prescription pads, and other drug diversion activities in their areas. After confirming reports from pharmacists, dentists or physicians, the coordinator of the system will initiate a warning to the appropriate areas of the province.

The College also maintains a file of names used by persons involved in drug diversion incidents. Practitioners are welcome to make inquiries with regard to names included in the file. Contact the Communications Coordinator, College of Pharmacists of B.C., 683-6588.

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Editor's Note: British Columbia is currently the only province in Canada which has a telephone alert system to warn of potential drug abusers.

Convention

Canadian Dental Association and the Order of Dentists of Quebec Convention

Les Journées dentaires 1984 — April in Montreal — From April 8-12, 1984

Two major conventions were held in 1983: les Journées dentaires du Québec in Montréal during May and the CDA national Convention in Vancouver during September. Without any doubt, both were highly successful!

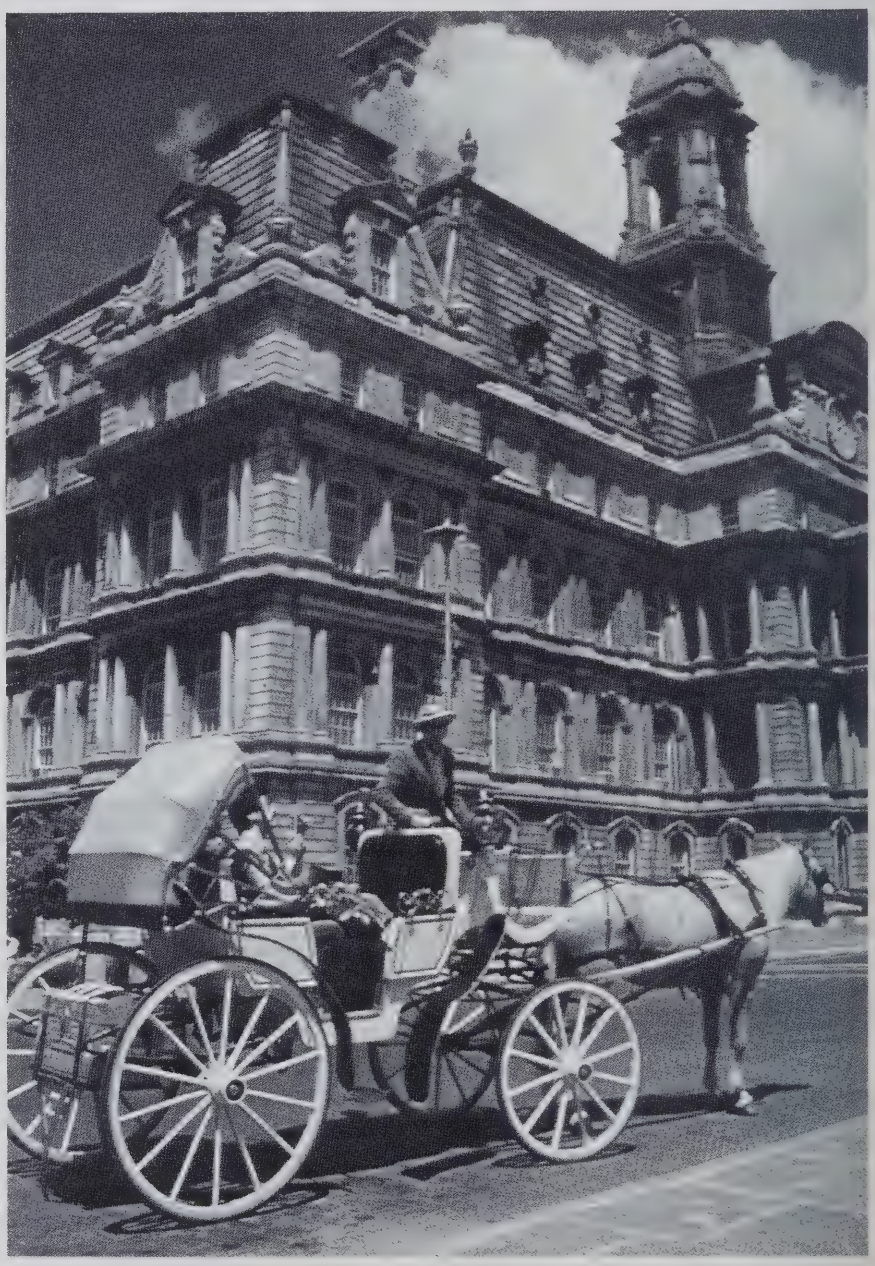
In April 1984, an unequalled event will take place: les Journées dentaires 1984. Joining their efforts, the Canadian Dental Association and l'Ordre des dentistes du Québec will offer you a very promising program with sessions on topics in the forefront of progress. This unique program will be presented in both languages and will be comprehensive in English as well as in French. Many national organizations and associations will join us in making this gathering an unforgettable one.

For your enjoyment surprises will be in store every evening with gourmet dinners, shows, songs and dances.

April in Montreal... an ideal opportunity to discover a city which is unique in North America. Montreal constitutes a real link between the traditions of the old and the effervescence of the new. You will find the European traditions adroitly united to the know-how of the New World.

Both the presidents of the CDA and of the ODQ and the Organization Committee invite you to attend this great Convention in Montreal. All will be there to wish you welcome.

Dr. Michel Jahjah
General Chairman



Les Journées Dentaires 1984

Pre-Convention/Limited Attendance Courses
Pré-congrès/Séances réservées

Queen Elizabeth Hotel/Hôtel Reine Elizabeth

English Program/Programme en anglais

Sunday, April 8 9h00 — 12h00 14h00 — 17h00

DR. FRANCIS G. EDWARDS
THE MARKETING OF PROFESSIONAL SERVICES

Dentists have long regarded the direct marketing of their services as undignified and unprofessional. Today, there are serious reasons to reconsider this position. The health of the oral cavity is getting better with every passing decade. Improved hygiene, better nutrition, fluorides and education have all decreased demand, while increasing numbers of new graduates look for practice locations in already over-serviced communities. Some believe that advertising will help. So far there is little evidence to support this belief.

More far-sighted professionals, realizing that advertising is just a part of marketing have now begun to ask, "What is marketing?, How do I learn more about it?, How will it affect my practice?, Will I suffer if others do it and I don't? Fortunately, over the years, a body of reliable knowledge on the subject of marketing has slowly been developed. With appropriate refinements, much of it is directly applicable to professional services.

Topics covered will include: The evolution of modern marketing; How purchasing decisions are made; Does the dentist need to advertise?; The importance of non-verbal communications; How to improve personal contacts; How to do some basic marketing research.

Monday, April 9 9h00 — 12h00 14h00 — 17h00

DR. ALVIN J. FILLASTRE
PREDICTABLE RESTORATIVE PROCEDURES

A large measure of the stress which many dentists experience today in dental practice is due to lack of predictability of treatment results. With the objective of increasing predictability of finished cases, Dr. Fillastre will present his concepts and techniques proven to lead to this end. A partial list of subjects includes tooth preparation design, impression, pontic design, provisional restorations, and cementation. Special emphasis will be given to methods of communication to the dental laboratory technician on exactly what is desired with regard to both occlusion and esthetics.

Dr. Fillastre has presented many programs throughout the U.S. as well as several foreign countries. He believes that the practice of dentistry should be a gratifying and pleasurable experience. His lectures reflect this philosophy and will show you how to approach a similar attitude.

French Program/Programme en français

Dimanche 8 avril 9h00 — 12h00 14h00 — 17h00

DOCTEURS PIERRE DUQUETTE
& ROBERT LANGLAIS (Programme '83 en reprise)
CONFÉRENCE CLINICO-PATHOLOGIQUE

Présentation de cas cliniques où chacun des participants pourra y aller de ses recommandations et expliquer les raisons qui l'incitent à poser un diagnostic spécifique.

Lundi 9 avril 9h00 — 12h00 14h00 — 17h00

DOCTEURS ALAIN VAILLANCOURT, JACQUES VALIQUETTE, CLAUDE LAMARCHE, NORMAND TARDIF, HUAN PHAM ET ALDO CAMARDA
JOURNÉE D'ÉTUDE EN PROTHÈSE COMPLÈTE

- Esthétique
- Prothèse hybride
- Mise en condition de la muqueuse
- Matériaux utilisés
- Chirurgie préprothétique
- Greffe de peau et abaissement du plancher
- Augmentation du volume de la crête par greffes osseuses ou autres matériaux
- Implant

Canadian Dental Association and The Order of Dentists of Quebec Convention

Les Journées Dentaires 1984
Preliminary Program

PRE-CONVENTION — LIMITED ATTENDANCE COURSES — RESERVATIONS REQUIRED — QUEEN ELIZABETH HOTEL

DATE/LANGUAGE	SPEAKER/TOPIC
Sunday, April 8, 1984	
English language:	Dr. Francis G. Edwards, California *The Marketing of professional services*
French language:	Dr. Pierre Duquette, Montreal Dr. Robert Langlais, Texas *Conférence Clinico-Pathologique* *(Programme '83 en reprise)*
Monday, April 9, 1984	
English language:	Dr. Alvin J. Fillastre, Florida *Predictable Restorative Procedures*
French language:	Dr. Alain Vaillancourt & Colleagues, Montreal — Dr. Aldo Camarda — Dr. Huan Pham — Dr. Claude Lamarche — Dr. Normand Tardif — Dr. Jacques Valiquette *Journée d'Étude en Prothèse Complète*

CONVENTION — Palais des Congrès **SCIENTIFIC PROGRAM — PROGRAMMES SCIENTIFIQUE**

Tuesday, April 10, 1984	
English language lectures:	Dr. Gérald Kramer, Boston *Images of comprehensive dentistry* Dr. Zia Shey, New Jersey *Pedodontics for the general practitioner* Mr. Bo Braze, Alabama *Modern Ceramic, Technique in dentistry* Dr. Thomas M. Graber, Illinois *The George Wellington Grieve Memorial Lecture*
French language lectures:	Dr. Haig Baltadjian — Dr. Guimond Hébert — Dr. Louis Philippe Lemay — Dr. Léon Lemian — Dr. Jean Turgeon, Montreal *Pot-Pourri cliniques* Dr. Robert Lawlor, Montreal *L'Hépatite B* Dr. Normand Brien, Montreal *Prothèse Partielle Amovible* Dr. Richard Taché, Montreal *Prothèse Complète* Dr. Peter Vaktor, Montreal *R.C.P.*

DATE/LANGUAGE	SPEAKER/TOPIC
Wednesday, April 11, 1984	
English language lectures:	Dr. Gerald E. Denehy Iowa *Getting the most out of composite resins* Dr. Glen McGivney, Milwaukee *Removable Partial Dentures* Dr. Doksoo Ahn — Dr. David Auerbach — Dr. Charles Dixter — Dr. Timothy Head — Dr. Ivan Stangel — Dr. Martin Tyler *Clinical Pot-Pourri* Dr. Peter Vaktor *C.P.R.* Dr. Arnold Aaron, New-York Dr. Robert Langlais, Texas *Oral Pathology* Table Clinics
French language lectures:	Dr. Jean-Marie Korbendau, France *Périodontie* Dr. Victor Legault, Montreal *Pédodontie* Dr. Murray H. Diner *Pédodontie* Dr. William Donahue & Dr. Ronald Fisher, Montreal *Traitement de patients atteints de cancer* Des conférences en endodontie et orthodontie seront annoncées ultérieurement. Entretiens cliniques
Thursday, April 12, 1984	
English program:	Dr. Harvey Weiner, Fort Lauderdale *Endodontics* Dr. Monica Belcourt, Montreal *Time Management* Dr. William Shaw *Computers in Dentistry*
French program:	Dr. Ronald Jones, Montreal *Occlusion* Dr. Hélène Lemay, Montreal *Pharmacologie* Dr. Pierre Desautels, Montreal *Matériaux dentaires*

Participating Organizations and Special Meetings

Many organizations and associations have made great efforts to allow their meeting to coincide with this joint convention. Those who have contributed directly to this convention are:

- CANADIAN ACADEMY OF PERIODONTOLOGY
- CANADIAN ACADEMY OF PAEDODONTICS
- CANADIAN ASSOCIATION OF ORTHODONTISTS

Some of the other participating organizations:

- ROYAL COLLEGE OF DENTISTS OF CANADA
- C.D.S.P.I.
- CANADIAN ACADEMY OF ORAL RADIOLOGY

The Canadian Dental Hygienists' Association
L'Association canadienne des hygiénistes dentaires

Scientific Program/Programme Scientifique

Tuesday, April 10 1984 — Mardi, le 10 avril 1984

Simultaneous translation in both languages all day.

Traduction simultanée dans les deux (2) langues toute la journée

Pat Johnson, CDHA, Ontario
"The past twenty years"

Sylvie de GRANDMONT, Montréal
"Le role de la Corporation"

Sharon Amer-French, Ontario
"The next twenty years"

Kim Ball, Ontario
"Financial Planning"

In addition, all scientific lectures are open to Dental Hygienists.

Toutes les conférences scientifiques sont ouvertes aux Hygiénistes Dentaires.

Wednesday, April 11 1984 — Mercredi, le 11 avril 1984

English	Docteur Samuel Green, Ontario "Creative Marketing in the Public Health Industry"	Anglais
English	Christine Wooley, Montréal "Dental Hygiene Residency"	Anglais
French	Sylvie Frechette, Montréal Judith Langlois, Montréal "Les enfants handicapés"	Français
Bilingual	Table Clinics/Entretiens cliniques	Bilingue
	Audio-Visual/audio-Visuel	

Thursday, April 12 1984 — Jeudi, le 12 avril 1984

Scientific Programs open to all/Programmes scientifiques ouverts à tous

Social Program/Programme Social

All these functions and more are included in the $75.00 registration fee

Toutes ces activités et plus sont incluses dans les frais d'inscription soit $75.00

Tuesday, April 10 1984 — Mardi, le 10 avril 1984

President's Luncheon/Déjeuner du Président
"April in Montreal"/"Avril à Montréal"

Wednesday, April 11 1984 — Mercredi, le 11 avril 1984

Wine and cheese reception/Dégustation de vins et fromages

Additional social events are available to CDHA members.

Événements sociaux additionels sont disponibles aux membres de l'ACHD.

Canadian Dental Assistants Association
Association canadienne des assistants (es) dentaires
The Quebec Dental Assistants Association
L'Association des assistants (es) dentaires du Québec

Scientific Program/Programme Scientifique

Wednesday, April 11 1984 — Mercredi, le 11 avril 1984

Simultaneous translation — Patricia Burger, Illinois "Touch your patient with love" — **Traduction simultanée**

Thursday, April 12 1984 — Jeudi, le 12 avril 1984

English — Docteur Monica Belcourt, Montréal "Time Management" — Anglais

Tuesday, April 10 1984 — Mardi, le 10 avril 1984

French — Docteur Robert Lawlor, Montréal "L'hépatite B" — Français

Social Program/Programme social

Tuesday, April 10 1984 — Mardi, le 10 avril 1984

Tuesday Evening "April in Montreal"/Soirée "Avril à Montréal"

Wednesday, April 11 1984 — Mercredi, le 11 avril 1984

Maple Camp Party/Soirée à l'érablière

Scientific and social program events listed included in $60 fee. Additional social events available to CDAA and QDAA members.

Toutes ces activités dans le liste sont incluses dans les frais d'inscription soit $60. Les membres de l'ACAD et de l'AADA recevront des billets additionnels pour les évènements sociaux.

Business Meetings/Réunions d'Affaires

CDAA annual meeting/Réunion annuelle de l'ACAD
QDAA annual meeting/Réunion annuelle de l'AADQ

DENTAL TECHNICIAN PROGRAM UNDER THE AUSPICES OF THE CORPORATION OF DENTAL TECHNICIANS OF QUEBEC

TUESDAY, April 10, 1984/MARDI 10 avril 1984

Mr. Bo Braze, Alabama
Modern Ceramic, Technique in Dentistry

In addition all scientific lectures are open to Dental Technicians who are members of the CPTDQ.

PROGRAMME DES TECHNICIENS DENTAIRES SOUS L'ÉGIDE DE LA CORPORATION DES TECHNICIENS DENTAIRES DU QUÉBEC

WEDNESDAY, April 11, 1984/MERCREDI 11 avril 1984

Dr. Arnold Aaron, New-York

Table Clinics/Entretiens cliniques

Audio-visual Program/Programme audio-visuel

De plus, toutes les conférences scientifiques sont ouvertes aux techniciens dentaires membres de la CPTDQ.

SOCIAL PROGRAM/PROGRAMME SOCIAL

Technicians have access to social programs such as April in Montreal and the Presidents Ball. These programs are not included in a general registration fee. (see registration form)

Tous les techniciens ont accès aux programmes sociaux tels que la soirée Avril à Montréal et la soirée des Présidents. Toutefois, ces évènements ne sont pas inclus dans l'inscription générale. (voir formulaire d'inscription)

PROGRAMME SOCIAL/SOCIAL PROGRAM

Tuesday April 10/mardi le 10 avril

AVRIL À MONTRÉAL

HÔTEL REINE ÉLIZABETH
20 h — 1 h

Buffet chaud et froid "à la Québécoise"
Spectacle surprise:
Chants et danses...
De l'animation plein la vue!
Danse continuelle

APRIL IN MONTREAL

QUEEN ELIZABETH HOTEL
20 h — 1 h

Hot and cold buffet "à la Québécoise"
Surprise show:
Song and dance...
Spectacular entertainment!
Non-stop dancing

Wednesday, April 11/mercredi le 11 avril

LA SOIRÉE DE GALA DES PRÉSIDENTS

CENTRE SHERATON
20 h — 1 h

Une soirée éblouissante en l'honneur des Présidents de l'Association dentaire canadienne et de l'Ordre des dentistes du Québec.

Repas de gourmet...
Décor magnifique...
Danse au son d'un grand orchestre...
Une soirée inoubliable.

PRESIDENTS' GALA EVENING

SHERATON CENTER HOTEL
20 h — 1 h

A dazzling evening in honour of the Presidents of The Canadian Dental Association and the Ordre des dentistes du Québec.

Gourmet meal...
Magnificent décor...
Dancing to the Big Band rhythm...
A memorable evening.

PROGRAMME DES CONJOINTS/SPOUSES' PROGRAM

HOTEL REINE ELIZABETH

Pas un moment d'ennui!

Un programme complet couvrant toute la durée du congrès est offert en anglais et en français.

Tous les goûts seront satisfaits.

Une seule inscription donnera accès à tout le congrès.

Toutes les conférences du programme scientifique sont ouvertes aux conjoints. La soirée "Avril à Montréal" est incluse dans l'inscription de $50.

Extraits du programme:

- Matinée à la Bourse
- Cours sur l'Analyse personnelle des couleurs
- Visite du Centre commercial Rockland
- Visites touristiques de Montréal
- Dégustation de vins
- Petit-déjeuner et conférence sur le "Time Management"

QUEEN ELIZABETH HOTEL

Never a dull moment!

Throughout the convention, a complete program is offered, both in French and in English.

There will be something for everyone.

One simple registration will open the doors of the whole convention. Spouses have access to all the conferences in the scientific program. Admission to the "April in Montréal" evening is included in the registration fee of $50.

Program highlights:

- Morning at the Montréal Stock Exchange
- Seminar on personal analysis through color
- Tour of the Rockland Shopping Centre
- Sightseeing tours of Montréal
- Wine tasting
- Breakfast and conference on Time Management

HOTEL RESERVATION FORM

(Please duplicate form if more than one room reservation is required)

NAME _____
(please print)

ADDRESS _____

_____
(including province, state and country) (zip code/postal code)

TELEPHONE NO. (Bus.) _____ (Residence) _____

PLEASE CHECK DESIGNATION ____ Dentist ____ Hygienist ____ Assistant
____ Technician ____ Student ____ Exhibitor
____ Other (please specify) _____

HOTEL CHOICE:

Queen Elizabeth Hotel (Canadian Dental Association/Order of Dentists of Quebec Convention Headquarters)

☐ Single ..... $75.00 ☐ Other, please specify .....
☐ Double/Twin ..... $75.00 .....

Sheraton Center (Hygienists & Assistants Headquarters)

☐ Single ..... $75.00 ☐ Other, please specify .....
☐ Double/Twin $75.00

Arrival Time and Date _____

Departure Date _____

HOTEL WILL CONFIRM RESERVATION DIRECTLY WITH DELEGATE. ANY SUBSEQUENT CHANGES TO THE RESERVATION SHOULD BE MADE DIRECTLY WITH THE HOTEL.

PLEASE MAIL TO:

CDA/ODQ CONVENTION
3565, Berri Street, Suite 200
Montreal, Quebec H2L 4G3

IT'S OFFICIAL

Your meeting is registered with Convention Central, Air Canada's exclusive reservations service for convention delegates. Benefits include:

CONVENTION FARE*

Save at least 20% with our new Convention Fare, available only through Convention Central. Should you qualify for other fares that represent greater savings, your reservations will be confirmed at the lowest available.

CAR RENTAL

If you like the convenience of a car when you arrive, Air Canada has arranged an attractive convention rate with Hertz. The savings are substantial, and available only through Convention Central.

Hertz

HERE'S ALL YOU DO

Call our toll-free number, identify yourself and your meeting, and our convention specialists will do the rest. If you customarily use a corporate travel department, or travel agent, have them call on your behalf. They can obtain the same benefits for you.

Call "Canada's #1 convention airline". . .weekdays 9:00 a.m. to 8:00 p.m. EDT/EST

*Certain advance purchase conditions apply.

AIR CANADA
CONVENTION CENTRAL

Registration Guide

Registration Form

1. Please fill in and return one form per person — only the name of the spouse should appear on the delegate form. One cheque may accompany more than one form.

   Some social events are not included in the basic fee and must be counted as extra. Please read carefully the information given on the form.

2. You will receive an acknowledgement of receipt which will confirm all the details pertaining to your registration.

3. Les Journées dentaires du Québec will be in two (2) parts:
   (a) Pre-Convention — Queen Elizabeth Hotel: April 8-9
   Pre-Convention Registration gives access to the reserved session(s) of your choice. Note that the Pre-Convention Registration is totally different from the Convention Registration.

   (b) Convention — Palais des Congrès: April 10-12
   — Conferences
   — Commercial exhibition
   — Programs for auxiliaries
   — Audio-visual program
   — Table Clinics
   — Social program (Queen Elizabeth Hotel & Sheraton Centre)
   — Spouse program (Queen Elizabeth Hotel)

4. Registration deadline: Pre-registration must be received by February 28, 1984 after which date they will be returned to sender. On location registration will be $10.00 more per person.

5. All delegates who register before the February 28 deadline will have a chance to win two Air Canada tickets to any place served by the company.

Plane reservation

An agreement has been established with Air Canada in order that delegates have an Air Canada office specially set up for them. For more information, see the ad.

Hotel reservation

Two hotels offer a special rate of $75.00 (single or double)

— Queen Elizabeth Hotel
  *Headquarters for les Journées dentaires du Québec, the Canadian Dental Association and l'Ordre des dentistes du Québec
  *Reserved sessions of April 8-9
  *"April in Montreal" party
  *Spouse program
— Sheraton Centre
  *Headquarters for hygienists and assistants
  *Presidents' Gala

N.B.: All hotel reservation forms must be returned to the Convention headquarters.

Les Journées Dentaires 1984
CDA/ODQ Joint Convention — Montreal
3565, Berri Street, Suite 200, Montreal, Que., H2L 4G3
April 8-12, 1984

ADVANCE REGISTRATION FORM — TO QUALIFY FOR THE AIR CANADA DRAW
SEND IN THIS WITH CHEQUE BEFORE FEBRUARY 28, 1984
REGISTRATION DURING CONVENTION WILL BE INCREASED BY $10.00 EACH

ONE FORM PER PERSON
DUPLICATE FORM FOR
MULTIPLE REGISTRATIONS

NAME _____

ADDRESS _____ Postal Code _____

TELEPHONE NO. (Bus.) _____ (Residence) _____

SPOUSE'S NAME, if attending _____

PLEASE CHECK APPROPRIATE CLASSIFICATION:

☐ DENTIST ☐ HYGIENIST ☐ ASSISTANT ☐ TECHNICIAN ☐ SPOUSE

PRE-CONVENTION — LIMITED ATTENDANCE COURSES APRIL 8-9, QUEEN ELIZABETH HOTEL

English Language

APRIL 8 DR. FRANCIS EDWARDS, **MARKETING OF YOUR PROFESSIONAL SERVICE** ..... Dr. .... 75.00 _____

(Simultaneous translation available) / Ass., Hyg. ..... 35.00 _____

APRIL 9 DR. ALVIN FILLASTRE, **PREDICTABLE RESTORATIVE PROCEDURES** ..... Dr., Tech. ..... 75.00 _____

French Language

APRIL 8 A.M. DR. PIERRE DUQUETTE, **CONFERENCE CLINICO-PATHOLOGIQUE*** (Repeat 1983 program)

Dr. ..... 40.00 _____

P.M. DR. ROBERT LANGLAIS, **CONFERENCE CLINICO-PATHOLOGIQUE*** ..... Dr. ..... 40.00 _____

*Participation course

APRIL 9 DR. ALAIN VAILLANCOURT & COLLEAGUES, **JOURNÉE D'ÉTUDE EN PROTHÈSE COMPLÈTE**

Dr., Tech. ..... 75.00 _____

— DR. CLAUDE LAMARCHE — DR. NORMAND TARDIF
— DR. HUAN PHAM — DR. JACQUES VALIQUETTE — DR. ALDO CAMARDA

CONVENTION — APRIL 10, 11 and 12 LE PALAIS DES CONGRÈS — CONVENTION CENTER

PLEASE CHECK APPROPRIATE BOX:

☐ DENTIST/member of the Order of Dentists of Quebec
Registration fee included in licence fee ..... nil _____
Includes: access to scientific sessions, exhibits, three (3) lunches, social events need separate reservations, see below

☐ DENTIST/licensed outside of Quebec
Includes: access to scientific sessions, exhibits, three (3) lunches, Monday welcoming reception, Tuesday evening soirée (April in Montreal), Presidents Ball need separate reservation, see below

CDA member/ADA member/foreign dentist ..... 195.00 _____

CDA Non member ..... 225.00 _____

April 11 CPR Course (limited to 40) will attend ☐ Yes ☐ No ..... _____ Ø

Registration form continued

SOCIAL EVENTS

☐ TUESDAY EVENING — **APRIL IN MONTREAL** (included in certain registration packages) _____ per person/20.00 _____

☐ WEDNESDAY EVENING — **PRESIDENTS BALL** (not included in any package) _____ per person/40.00 _____

☐ SPOUSE _____ per person/50.00 _____
Includes: access to scientific sessions, exhibits, Tuesday evening soirée (April in Montreal), personal colour analysis, shopping tour, city bus tour, wine tasting, champagne breakfast, tour of stock exchange (a limited attendance registration on a first come basis on site at the convention for certain programs)

☐ HYGIENIST _____ 75.00 _____
Includes: access to scientific sessions, exhibits, CDHA lecture series, Tuesday President's lunch, Tuesday evening soirée (April in Montreal), Wednesday lunch and wine and cheese reception.

☐ ASSISTANT _____ 60.00 _____
Includes: access to scientific sessions, exhibits, CDAA/AADQ/AADM Lectures, Tuesday evening soirée (April in Montreal), Wednesday night Maple Camp Party

Members of CDAA/AADA/AADM will receive additional social events.
Further information available at registration.

☐ TECHNICIAN/member CPTDQ _____ 65.00 _____
Includes: access to scientific sessions, exhibits. Social events need separate reservation (see above)

☐ STUDENT _____ nil Ø
On site registration only/Includes: access to scientific sessions and exhibits For final year student of Dental, Dental Assisting, Hygienist, Dental Technician schools

TOTAL: _____

PLEASE MAKE CHECK PAYABLE TO:

CDA/ODQ JOINT CONVENTION
3565, Berri Street
Suite 200
Montreal, Quebec
H2L 4G3

CANCELLATION POLICY: Cancellations **accepted before March 15** for full refund. Any cancellations after that date subject to a 25% administrative charge.

REGISTER PRIOR TO FEBRUARY 28 AND BE ELIGIBLE TO WIN TWO COMPLIMENTARY TICKETS TO ANY OF AIR CANADA'S WORLD DESTINATIONS!

Ours is the Best... and we'll Prove It.

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The system contains all of the programmes necessary to take full advantage of the capabilities of the computer in your dental office:

- Complete patient information
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- Complete histories
- Powerful query/report writer
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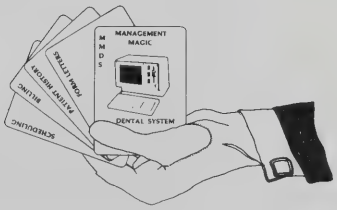
- Automatic data backup
- Complete accounting
- Easy graphics
- Electronic spreadsheet
- Automatic form letters
- Practice management
- Aged monthly statements
- Income analysis
- Complete statistics



MM-DS gives you the highest quality, precision engineered, up-to-date computer hardware. A simple, well designed screen and a full key board with number pad and twenty-seven special function keys for easy entry and retrieval of information. The system is easily understood and can be mastered by anyone in only a few days. Operator entry can begin after one day of instruction. Each item of information need only be entered once and is immediately integrated into all medical and accounting files.

10 MB Hard disk - 5 practitioners
5000 Patients - Perpetual History

$12,000.

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Management Magic Ltd.
Kingston, Canada

Continuing Dental Education

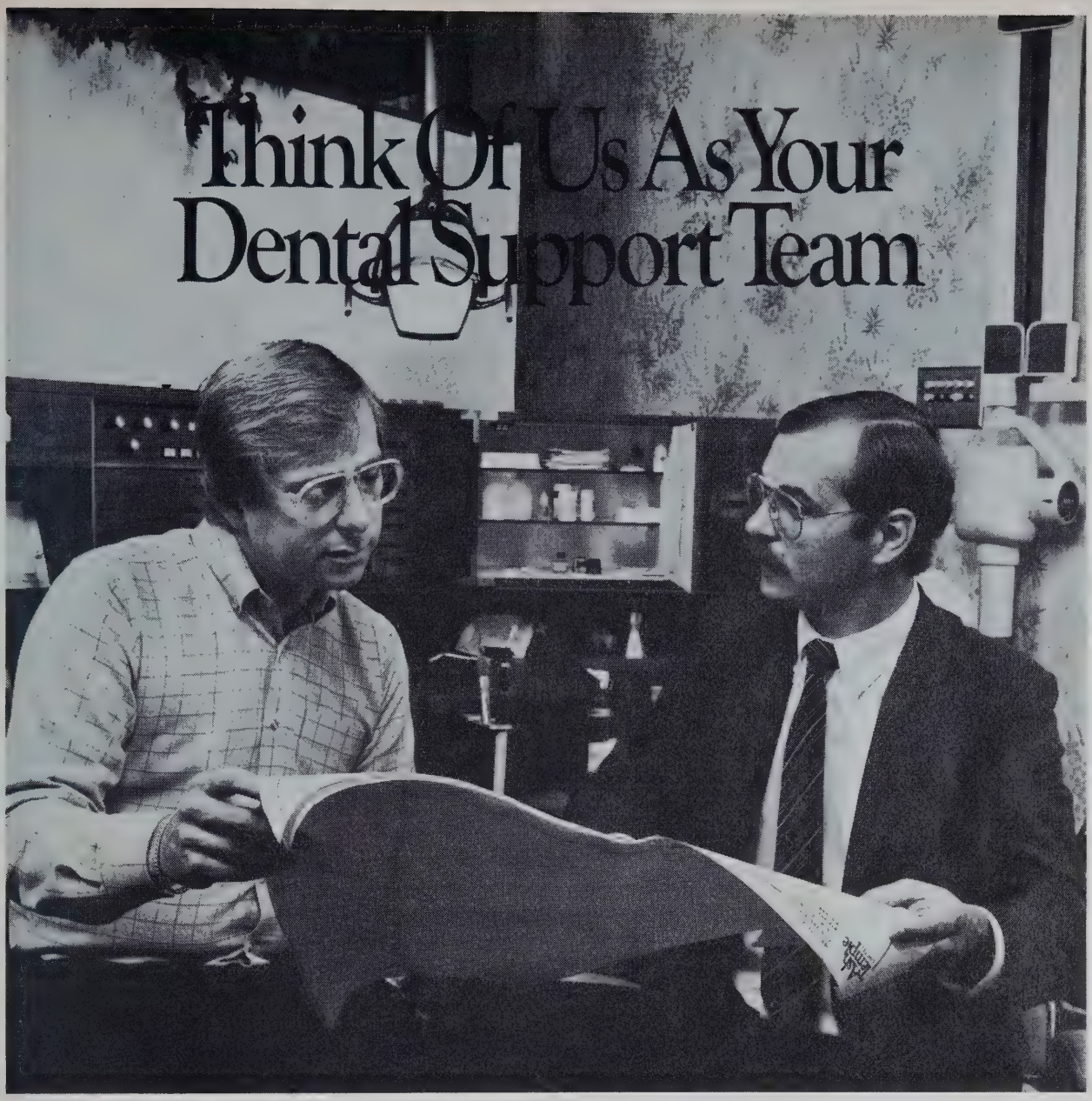
Sponsoring Institution/ Address	Location of Course	Title of Course	Subject Area	Date	Style	Instructor	Registration	Fee	Audience	Contact Person/ Telephone
Continuing Education, University of Alta., 4046 Dent/Pharm Bldg., Edmonton, Alta.	Edmonton, Alta.	Update of Concepts of Oral and Facial Pain	Basic Sciences	Jan. 12 1984	Lecture	Drs. C. Torneck B. Sessle	Open to Dentists only		GPs, Assistants, Hygienists	Dr. A.A. Bene or Louise Grottoli 403-432-5023
"	"	Contemporary Issues in Nutrition: Quackery and Fact	Nutrition	Jan. 14, 1984	Lecture	Mrs. Kay Davidson	Open		GPs, Assistants, Hygienists	"
"	Lethbridge, Alta.	Current Concepts of Pedodontics for the General Practitioner	Pedodontics	Jan. 21, 1984	Lecture	Drs. W. J. Simpson and A. J. Simons	Open		GPs, Hygienists,	"
"	Calgary, Alta.	Impacted 3rd Molar and other Minor Oral Surgery	Oral and Maxillofacial Surgery	Jan. 28, 1984	Lecture Demon. stration	Dr. B.K. Arora	Open		GPs, Assistants	"
"	Edmonton, Alta.	N_2/O_2 Sedation Analgesia	Anxiety and Pain Control	Feb. 11, 1984	Lecture Particip.	Dr. B. K. Arora	Open		GPs, Assistants	"
"	"	Shade Determination in Ceramic Restorations	Prosthodontics	Feb. 11, 1984	Lecture Particip.	Dr. G. B. Gilboe	Max 24		GPs	"
"	"	Restorative Symposium in	Operative Dentistry	Mar. 2-3, 1984	Lecture	Drs. K. Zakariasen	Open		GPs, Assistants Dentistry	"
"	"	Clinical Oral Pathology/ Radiology	Oral Pathology Oral Radiology	Mar. 10, 1984	Lecture	Dr. W. T. McGaw/ D. Hatcher	Open		GPs, Assistants	"
"	Red Deer, Alta.	Radiological Interpretation in General Dental Practice	Oral Radiology	Mar. 17, 1984	Lecture	Dr. C. Baker	Open		GPs, Assistants Hygienists	"
"	Edmonton, Alta.	Controversies in Endodontics	Endodontics	Mar. 24, 1984	Lecture	Drs. K. Zakariasen/ C. Hawrish	Open		GPs, Assistants	"
"	Medicine Hat, Alta.	Endodontics: Open, Shape and clean		Mar. 31, 1984	Lecture	Dr. C. Hawrish	Open		GPs, Assistants, Hygienists	"
"	Banff, Alta.	Update: Oral Diagnosis/Oral Medicine Endo.	Oral Medicine Diagnosis	Mar. 31- Apr. 4, 1984	Lecture	Drs. K. Zakariasen/ G. Raborn	Open		GPs, Assistants,	"
"	Calgary, Alta.	Clinical Anatomy Growth Malformation of Face and Jaws	Basic Sciences	Apr. 7, 1984	Lecture Demon.	Dr. G. H. Sperber	Open		GPs, Assistants	"

"	Edmonton, Alta.	Molar Endodontics	Endodontics	Apr. 14, 1984	Lecture Partic.	Dr. K. Zakariasen	Max. 40		GPs	"
"	Calgary, Alta.	Pain Control: Update on Anesthetics	Pain Management	Apr. 27, 1984	Lecture	Dr. Paul Moore	Open		GPs	"
"	Edmonton, Alta.	Pain Control: Update on Anesthetics	Pain Management	Apr. 28, 1984	Lecture	Dr. Paul Moore	Open	GPs	"	
"	"	Clinical Gross Anatomy	Basic Sciences	May 11-12, 1984	Lecture Demon.	Dr. G. H. Sperber			GPs	"
"	"	Conscious Sedation	Anxiety and Pain Control	May 14-18, 1984	Lecture Demon. Particip.	Dr. B. K. Arora	Max. 16		GPs	"
"	"	Root Planing Current Concepts	Periodontics	May 24-26, 1984	Lecture Demon. Partic.	Dr. A. Frydman	Max. 35		GPs, Hygienists	"
Manitoba Dental Association, 300-296 Kennedy St., Winnipeg, Man. R3B 2M6	Winnipeg, Man.	Oral Surgery: Review for the GP		Feb. 3-4	Lecture	Dr. S. Weinberg		Total fee $120 for all three courses part of MDA Annual Meeting		Ross McIntyre 204-942-5211
"	"	How to design a healthy lifestyle		Feb. 3-4	Lecture	Dr. K. Dychytwald				"
"	"	The Human side of dentistry		Feb. 3-4	Lecture	Dr. K. Olson				"
"	"	Removable Dental Prostheses		Feb. 17	Lecture	Dr. G. Matheson		$75		"
"	"	Endodontics		Mar. 3	Lecture	Dr. W. Acheson, B. Christie, M. Peikoff		$75		"
Winnipeg Dental Society c/o Manitoba Dent. Assoc.	"	MPD Syndrome, TMJ		Apr. 28	Lecture	Dr. J. McCarthy		$75		"
"	"	Complex Amalgam Restoration		Mar. 12	Lecture	Dr. H. Shavell				"
"	"	Computer Applications in a modern private practice		Apr. 9	Lecture	Dr. F. Chebib				"
University of Toronto, 124 Edward St., Toronto, Ont. M5G 1G6	Toronto, Ont.		Endodontics	Jan. 12/84	Lecture	Drs. B. Korzen W. H. Pulver	Max. 50	$125	GPs	Mai Pohlak 416-978-2358
"	"	Photography in Dentistry		Feb. 17	Lecture Demo. Partic.	Rita Bauer	Max. 12	$75 DDS $50 Aux	Dental Team	"
"	"	Osseointegration		Feb. 27-29	Lecture	Dr. G. Zarb	Max. 50	$1250	Specialists	"

Sponsoring Institution/ Address	Location of Course	Title of Course	Subject Area	Date	Style	Instructor	Registration	Fee	Audience	Contact Person/ Telephone
University of Toronto, 124 Edward St., Toronto, Ont. M5G 1G6	Toronto, Ont.	CPR and Emergency Measures	CPR	Mar. 14-16	Lecture Demo. Partic.	Dr. S. Small	Max. 16 8 DDS, 8 Aux, Aux must Accompany DDS	$150 DDS $75 Aux	GPs, Assist., Hygienists, Technicians	519-679-2862
"	"	Sports Dentistry		Mar. 30-31	Lecture Demo.	Dr. N. Levine	Max. 100	$225	GPs, Spec.	"
"	"	Periodontics	Periodontics	Mar. 28, Apr. 4, 11, 18, 25, May 2/84	Lecture Partic.	Dr. J. Speck	Max. 8	$700	GPs	"
"	"	Long Cone Paralleling Technique	Oral Radiology	Apr. 5-6	Lecture Partic.	Drs. F. Kellam, K. Barlow	Max. 10	$200 DDS DDS & Aux $300	GPs, Assist., & Hygiene	"
"	"	ABC Recipe to Building an Emergency kit and Using it	Pain Management	Apr. 6	Lecture	Dr. S. Small	Max. 30	$60	GPs, Assist., Hyg.	"
"	"	Preventive Dentistry	Preventive Dentistry	Apr. 25-26	Lecture	Mai Pohlak	Open	$200 DDS $100 Aux	GPs, Assist., Hyg.	"
"	"	Restorative Dentistry		Apr. 26-28	Lecture Partic.	Drs. A. Hord, J. Brown	Max. 12	$300	GPs.	"
"	"	Orthodontics for the General Practitioner	Orthodontics	Apr. 30, May 1-4	Lecture Partic.	Drs. R. Fisk, G. Altuna	Max. 25	$600	GPs	"
"	"	Crown and Bridge	Prosthodontics	Apr. 30, May 1-2	Lecture Partic.	Dr. D. McAdam	Max. 12	$400	GPs	"
"	"	Local Anaesthesia		May 2	Lecture	Dr. S. Small	Max. 25	$100	GPs	"
"	"	Osseointegration		May 7-9	Lecture Partic.	Dr. G. Zarb	Max. 50	$1250	Spec.	"
Ontario Dental Association 234 St. George St. Toronto, Ont.	Toronto	Perio-100		Feb. 3		Dr. Freeman, Dr. Pierson				Dr. J. Goodman 416-922-3900
"	Windsor	Anaesthesia 100		Feb. 3		Dr. Mel Hawkins				"
"	Toronto	Computerization		Feb. 7		Dr. M. Barrington				"
"	Sault Ste. Marie	Computer 101		Feb. 17		"				"
"	Thunder Bay	"		Feb. 20		"				"
"	Timmins	Paedo-101		Feb. 23		Dr. M. Barrington				"
"	North Bay	"		Feb. 24		"				"
"	Toronto	Paedo-101		Feb. 24		Dr. D. Kenny				"
"	Cornwall	Computer 101		Mar. 2		Mr. M. Barrington				"

"	St. Thomas	Tax Planning (PM-103)		Mar. 9		Dr. J. Britton				"
"	Toronto	PM-104		Mar. 9		Mr. David Prentice		$150		"
"	"	PM-101 (Practice Building)		Mar. 23		Dr. J. Britton		$150		"
"	"	Computer 101		Mar. 23		M. Barrington		$150		"
"	Toronto	Anaesthesia 201		Mar. 24		Dr. Mel Hawkins		$325		"
"	Orillia	Paedo-101		Mar. 30		Dr. D. Kenny		$150		"
"	Toronto	Perio 200		Apr. 8		Drs. Freeman and Pierson	Limited	$150		"
"	Oshawa	Computer 101		Apr. 13		M. Barrington		$150		"
"	Toronto	Anaes 202		Apr. 14		Dr. Mel Hawkins				"
"	"	Endo-100		Apr. 27		Dr. B. Dolansky				"
"	"	Perio-200		May 6		Drs. Freeman and Pierson	Limited			"
"	Toronto	Endo-200		May 13		Dr. B. Dolansky	Limited	$325		"
"	"	PM-102 Effective Persuasion		May 25		Mr. David Prentice		$150		"
"	Windsor	Computer 101		June 1		M. Barrington				"
"	Thunder Bay	Paedo-101		June 1		Dr. D. Kenny				"
"	"	Paedo 102		June 2		Dr. D. Kenny				"
"	Toronto	Perio-200		June 8		Drs. Freeman and Pierson	Limited	$1000 for 2 days		"
"	Kitchener	PM-104		June 8		Dr. J. Britton				"
"	Ottawa	PM 101		"		"				"
"	Toronto	Anaes-100		June 15		Dr. M. Hawkins				"
"	"	Perio-200		June 22		Drs. Freeman and Pierson				"
University of Western Ontario, Continuing Education, Faculty of Dentistry, London, Ont. N6A 5C1	London, Ont.	Occlusion II A Gnathologic Waxing Course		Feb. 3-4	Lecture Partic.	Drs. W. Teteruck, D. Gratton and A. Mills	Max. 16	$300		519-679-2862
"	"	Removable Partial Dentures	Prosthodontics	Apr. 5-7	Lecture	Dr. P. Sills, Dr. D. Charles	Max. 24	$275		519-679-2862
"	"	Panoramic Dental Radiography		Apr. 11		Dr. R. G. Stephens	Max. 20	$115		"

Sponsoring Institution/ Address	Location of Course	Title of Course	Subject Area	Date	Style	Instructor	Registration	Fee	Audience	Contact Person/ Telephone
University of Western Ontario, Continuing Education, Faculty of Dentistry, London, Ont. N6A 5C1	London, Ont.	Forensic Dentistry An Overview	Forensic Dentistry	Apr. 13		Dr. S. Kogon	Min. 10	$60		519-679-2862
"	"	CPR and a Review of Emergency Drugs	CPR	Apr. 14		Either Dr. I. Schofield or A. Parnell	Max. 24	$100 DDS $75 Aux		"
"	"	Esthetic Dentistry		Apr. 12-14		Dr. R. Jordan	Max. 25	$400		"
"	"	Complete Dentures Today	Prosthodontics	Apr. 27-28		Dr. P. Sills, Dr. R. Brooke	Min. 15	$200		"
"	"	Nitrous Oxide/ Oxygen Conscious Sedation		May 23-25		Dr. I. Schofield	Max. 25	$425 or $475		"
"	"	Practice Admin. in the 80's		June 8-9		R. A. Brandon	Unlimited	DDS $200 Aux $75		"
Dalhousie University Halifax, N.S. B3H 3J5	Halifax, N.S.	Magic Shadows	Oral Radiology	Jan. 27-28	Lecture Demo. Partic.	Dr. Dale Miles	Max. 24	DDS $125 Aux $75	Whole dental team	Kaireen Vaison 902-424-6507 or 902-424-6507
"	"	Local and General disorders in perspective	Oral Medicine/ Diagnosis	Feb. 13-14	Lecture	Drs. R. Brooke, K. Bentley	Open	DDS $160 Aux $110	GP's, Spec. Assist., Hyg.	"
"	Cornerbrook, Nfld.	Restorative Drill and Fill	Restorative Dentistry	Feb. 24-25	Lecture	Dr. R. Bannerman, Dr. Bob MacDonald	Open	TBA	Whole dental team	"
"	Halifax, N.S.	Complete Dentures	Prosthodontics	Feb. 20-21	Lecture Demo.	Drs. B. Hoar, R. Brygider	Open	$170	GP's, Technic.	"
"	"	Orthodontics	Orthodontics	Feb. 22-23	Lecture Demo. Partic.	Dr. Bob Hoar	Open	$180	GP's, Technic.	"
"	Halifax, N.S.	Ceramic Characterization	Operative Dentistry	Feb. 23-25	Lecture Demo. Partic.	Dr. V. Shassner, Dr. M. Roda	Open	$170	Technicians, GPs	"
"	"	Orthodontics for Hygienists	Dental Hygiene	Mar. 2-3	Lecture	Dr. W. Barro, Dr. P. Bourque	Open	$110	Hygienists	"
"	"	Periodontics	Periodontics	Mar. 30-31	Lecture	Dr. N. Boucher	Open	TBA	GP's, Spec. Assist., Hyg.	"
"	Sydney, N.S.	Ortho-Perio.	Ortho-Perio.	Apr. 14-15	Lecture	Dr. W. Barro plus TBA	Open	$170 DDS	GP's, Spec. Assist., Hyg.	"
"	"	Post College Assembly '84	TMJ, Geriatrics, Resins	May 6-7-8	Lecture	Dr. C. Green & TBA	Open	DDS $200 Aux $150	All dental team	"
"	St. Johns, Nfld.	Endodontics	Endodontics	May 12	Lecture	Dr. S. Drayton, Dr. G. Burke	Open	TBA	GP's, Spec.	"



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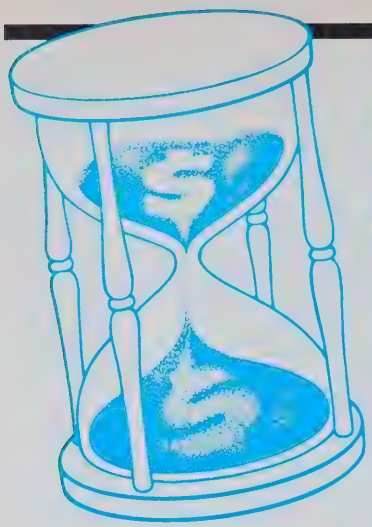

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FEBRUARY 29, 1984

IS THE LAST DATE FOR CONTRIBUTIONS TO A RRSP AS A 1983 TAX DEDUCTION.

If you have not yet made your deposit for 1983, **NOW IS THE TIME TO ACT.** In order to obtain a full tax benefit and invest towards your financial security at retirement, make your contribution now.

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The CDA RRSP is a membership service of the Canadian Dental Association, administered by ***Canadian Dental Service Plans Inc.***

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Dead Sea, Israel — March 13 — 18, 1984

Contact:

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Pays Scandinaves: Danemark, Norvège, Suède

Pays Nordiques: Groenland, Islande ainsi que Copenhague et Stockholm

La russie: Moscow, Leningrad, Kiev, Baku, Yalta: Hébergement deluxe, théâtre, soirée gala et plus sont inclus.

Nous offrirons aussi des excursions durant la Conférence, tel que Lapland en Artic, le Cape Nord, la Capitale du soleil de minuit.

Réservez tôt: places sont limitées.

Nous avons aussi un tour spécial en conjunction avec la première conférence dentaire internationalle, portant sur de droit et l'éthique médicale.

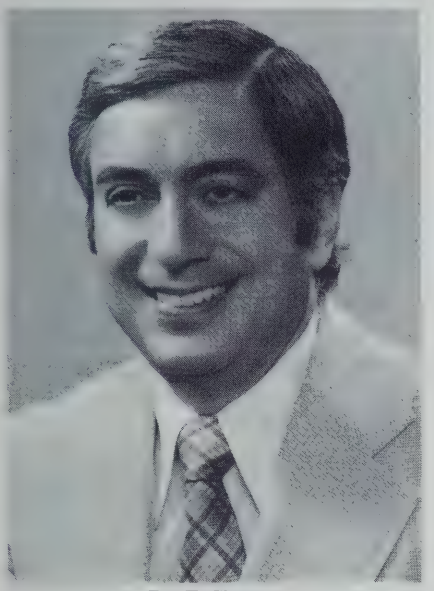
Mer Morte, Israel du 13 au 18 mars 1984

Contactez:

Allan's Travel Service Ltd.
56 Sparks St.
Suite 804
Ottawa, Ont. K1P 5A9
Tel: (613) 238-5696

Briefly —

Dr. Frank E. Shamy of Montreal was recently elected President of the Canadian Association of Orthodontists at the Association's Annual Meeting which took place in Vancouver, B.C.



Dr. F. Shamy

Dr. Shamy received B.Sc. and D.D.S. degrees from McGill University in 1954 and 1956 respectively, and an M.Sc. degree from the Université de Montréal in 1964. He served on the McGill teaching staff from 1957 to 1975, and is a past president of the Québec Association of Orthodontists.

Also elected to the executive were: Dr. Ian Milne, Ottawa, president-elect; Dr. Morley Bernstein, Winnipeg, 1st vice-president; Dr Oleg Kopytov, Montreal, 2nd vice-president; Dr. Jean-Louis Ares, Edmonton, executive director. Immediate past-president is Dr. Robert Hicks, now CDA President.

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The Quebec Association of Periodontists recently elected a new executive.

Taking over from past president, Dr. Sam Galperin, is new president Dr. Jean Pierre Masson. Vice-president is Dr. Mervin Werbitt, while the new Secretary-treasurer is Dr. Allen Shapiro.

All four members of the Association's executive are natives of Montreal, Quebec.

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With their 35th Annual Meeting just over, the Canadian Association of Orthodontists is already making plans for their 36th meeting, which will be held in conjunction with the combined CDA/ODQ Convention in April. The meeting is scheduled to take place from April 8-10 at Montreal's Hotel Bonaventure.

The association has already lined up an impressive roster of scientific speakers. Dr. Richard Litt will speak on Surgical Orthodontics, Science or Art, Dr. Robert Rubin's topic is on the influence of nasal obstruction on facial growth and occlusion, and Dr. Tom Graber has been asked to talk about temporomandibular joint function and dysfunction, and its diagnosis and treatment. Dr. Graber will also present the Grieve Memorial Lecture on April 10.

Anyone wishing further information on the upcoming meeting should notify the convention chairman, Dr. Kopytov, who may be reached at 3535 Queen Mary Road, Suite 309, Montreal, Quebec H3V 1H8 (514-735-4246).

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The Canadian Dental Association frequently receives requests for information from both members of the public and members of the profession.

Documentation on fluoridation is one of the more popular packages which is available free of charge to both the public and the profession. Four sections of the CDA Fluoridation Kit are available for distribution. These are: "Analyzing Selected Criticisms of Water Fluoridation", a CDA policy statement on the subject, "CDA's Guide for Local Fluoridation Campaigns" and "CDA's Guide for Provincial Fluoridation Campaigns."

The first two sections are available on request to anyone making an inquiry. The second two sections of the Kit are available to CDA members only, provincial bodies or associated and affiliated societies.

Contact the Communications Department at CDA headquarters for copies or further details.

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At a recent meeting of the Canadian Academy of Prosthodontists, one of the experts in the field, in both the U.S. and Canada, Dr. Earl Pound of Westlake Village, California was honored.

L-R; Dr. Balanko, Dr. Pound

Dr. Pound, shown in the photo at right, is a native Canadian. He is shown receiving from Dr. Michael Balanko, immediate past-president of the Canadian Academy of Prosthodontists, an Honorary Membership in that Academy.

Dr. Pound is a known expert in the fields of dental esthetics, rehabilitation and prosthodontics, both in Canada and the U.S.

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The College of Dental Surgeons of Saskatchewan recently elected new officers for 1984. Dr. W.P. Reed of Regina, Saskatchewan, was elected President of the College for 1984.

New Vice-President is Dr. G.A. Riekman of Saskatoon, Sask. A new member of the College was elected to the Council. Dr. G. Howard of Prince Albert, Saskatchewan will serve on the Council for a two year term.

All appointments, according to Dr. George Peacock, registrar of the Col-

lege, became effective January 1, 1984.

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At the recent annual meeting of the Canadian Academy of Endodontics, held in Winnipeg, Dr. Marshall Peikoff of Winnipeg was elected President for the 1983-84 year. President-Elect is Dr. Barry Korzen, Willowdale, Ontario. The Treasurer and Executive Secretary are, respectively, Dr. Fred Weinstein of Vancouver and Dr. John Phillips from Oshawa, Ontario.

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The Second International Cosmetic Dentistry Extravaganza, co-sponsored by the Journal of Cosmetic Dentistry and the Den-Mat Corporation, will take place in Maui, Hawaii, January 19-24, 1984.

The first Extravaganza, which took place last summer at Epcot Centre, Disney World, Florida, was highly successful. The Extravaganza attracted over 350 dental practitioners from both the U.S. and Canada. Seminars on the latest techniques in cosmetic dentistry, and table clinics were given by leading experts in the field.

Speakers included Dr. Ronald Jordan, University of Western Ontario, Dr. Ralph Phillips, University of Indiana, Dr. Irwin Smigel, President of the American Society of Dental Aesthetics, Dr. Harold Horn of New York University and Dr. Richard Simonsen of the University of Connecticut.

Canadian dentists attending came from Ontario, Quebec, Alberta, Manitoba and British Columbia.

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Dr. Michael W. Lasko is the lucky winner of the CDSPI Convention Draw, which was held during the National Convention in Vancouver.

A Winnipeg, Manitoba, native, Dr. Lasko received a $500 gift certificate for a colour television set.

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The first issue of *The Bottom Line* arrived in our mail recently, and it looks as if it is going to become a 'hot' item.

A self-professed newsletter designed to give financial and general management tips to small business operators, this small four-page monthly is packed full of goodies. The inaugural issue — published in October — contains short newsy pieces on how a banker assesses a company's credit worth, choosing between a salary and dividends, the story behind Indexed Security Investment Plans (ISIPs), and how to sell to the government.

Lawrence Publishing Inc. of Toronto, Ontario, promise to bring the reader up-to-date information latest developments in income tax, cash management and inventory planning, special interviews and articles advising you on the most effective way to run your business. "The aim of *the bottom line* is to help you be more successful by sharpening your financial management skills," say the publishers.

Individual subscriptions can be had for $72 a year. Interested small businessmen, etc. may contact Lawrence Publishing Inc., 1540 Eglinton Avenue West, Toronto, Ontario M6E 2G8 (418-787-0156).

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The promotion of dentistry to federal politicians is high on the list of duties of the new President of the American Dental Association.

In his inaugural speech at the final session of the ADA's House of Delegates, held October 6, Dr. Donald E. Bentley of Hawley, Minnesota, stressed the need for the ADA to "strengthen efforts to convince, persuade and inform Washington of the interests and intent of dentistry."

President-Elect to Dr. Bentley is Dr. John L. Bomba of Philadelphia, Pennsylvania, who served as ADA's treasurer last year and as a trustee for six years.

Dr. Joseph Cabot of Lathrup Village, Michigan, was named first Vice-President, while Dr. Richard A. Kozal, Summitt, Illinois, was elected second Vice-President. The Speaker of the House of Delegates is Dr. Bernard S. Snyder from Columbus, Ohio.

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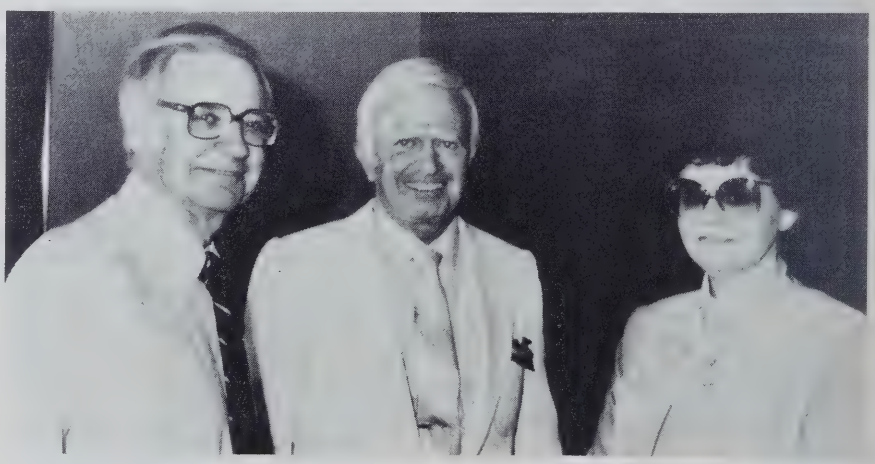
The Canadian Dental Association is continuing its discussions with Revenue Canada regarding the taxation of management companies in the profession.

Recently a letter was sent to the Director General of the Compliance Directorate at Revenue Canada, Taxation, detailing the Association's views on the subject. In early December, a letter was sent to all CDA members, via CDA's quarterly Communique, detailing the views of the Association and urging members to communicate with their Members of Parliament on this issue.

For more information on this subject, contact CDA headquarters.



Left to right: Dr. Ralph Phillips of the University of Indiana, Dr. Harold R. Horn of New York University and Pam Orsini of the Den-Mat Corporation were in attendance at the First International Cosmetic Dentistry Extravaganza held last year in Florida. The second Extravaganza takes place this month.

Review of Library Services
Services offerts par la bibliothèque

The following is a list of services which are available at no cost to all members, both dentists and students, and affiliated dental groups:

— **MEDLINE** literature searches: this computerized information retrieval system provides access to over 3,000 medical and dental journals and produces instant bibliographies of varying length and depth of topic coverage. The Association is accepting collect calls for this service from all members. There is a $25.00 fee for non-members for each search.

— **SDI:** this is a monthly current awareness bibliography. The requester's original search in MEDLINE is stored in the computer and updates are then sent automatically twelve times a year. There is a monthly charge of $25.00 for non-members.

— **Copies of contents pages** of the most current dental journals received by the Library/Resource Centre. This package is sent once a month to interested members. There is a monthly charge of $5.00 to non-members for this service.

— **Photocopies of journal articles.** All reasonable requests are processed free of charge to CDA members; there is a $5.00 administrative fee for non-members.

— **"Package Libraries"**: these are selected articles on topics of interest to the dental community and advertised each month in the *Journal.* One copy of each article listed is provided free of charge to members and there is a $5.00 fee for non-members. In addition, all the packages listed in previous issues of the *Journal* are still available:

Dental Radiography
Peer Review and Quality Assurance
Geriatric Dentistry
Computers in Dental Practice
Dental Materials and Techniques
Community and Preventive Dentistry
Anesthesia in Dentistry
Dental Practice Management
Dental Occlusion
Oral Cancer
Dentists and Stress
TMJ Dysfunction Diagnosis
Mercury Pollution in the Dental Office
Dental Emergencies
Economic Management
AIDS (Acquired Immune Deficiency Syndrome)
Pedodontics
Anorexia Nervosa and Bulimia
Periodontal Diseases

Voici une liste des services offerts gratuitement à tous les membres de l'ADC, les étudiants comme les dentistes, ainsi qu'aux organismes affiliés.

MEDLINE: il s'agit d'un système de recherche informatisé donnant accès à plus de 3 000 titres de revues médicales et dentaires et fournissant des bibliographies sur divers sujets. L'ADC accepte les appels à frais virés provenant des membres qui veulent interroger MEDLINE. Pour les non membres, chaque demande coûte 25$.

SDI ***(Selected Distribution Information)***: Il s'agit d'une recherche bibliographique portant sur un sujet donné et mise à jour tous les mois. Quand une personne demande une bibliographie sur un sujet particulier, sa demande est confiée à l'ordinateur qui, chaque mois, met la bibliographie à jour. Tous les mois, la personne est ainsi renseignée sur les nouveaux articles parus. Pour les non membres, ce service coûte 25$ par mois.

— ***photocopies:*** la bibliothèque offre à ceux qui le désirent des photocopies d'articles parus dans des revues. Pour les non membres, chaque demande coûte 5$.

— ***bibliographies:*** chaque mois, la bibliothèque fait paraître dans le *Journal de l'ADC* une bibliographie sur un sujet d'intérêt pour la communauté dentaire. Une copie de chaque article énuméré est fournie aux membres sur demande. Pour les non membres, chaque demande coûte 5$. De plus, les bibliographies déjà publiées restent toujours disponibles. En voici la liste complète jusqu'à ce jour:

la radiographie dentaire
la révision professionnelle et l'assurance touchant la qualité des services
la dentisterie gérontologique
les ordinateurs au cabinet dentaire
les matériaux et les techniques dentaires
la dentisterie communautaire et préventive
l'anesthésie en dentisterie
la gestion du cabinet dentaire
l'occlusion dentaire
le cancer buccal
le dentiste et le stress
le diagnostic touchant les dysfonctions des articulations temporomandibulaires
la pollution par le mercure dans le cabinet dentaire
les urgences dentaires
la gestion financière
le SIDA (syndrome de l'immuno-déficience acquise)
le pédodontie
l'anorexie mentale et la boulimie
les maladies parodontaires

— **General inquiries** on dentally related topics: assistance is provided free of charge to all members; there may be a $5.00 fee for non-members, depending on the extensiveness of the request.

— **New Acquisitions** are published each month in the *Journal* and most of the material (with the exception of journals) is available on loan to interested members across Canada. There is an administrative fee of $5.00 for non-members. The following is a list of acquisitions which have been advertised in the *Journal* since January of 1982:

— ***demandes générales reliées à la dentisterie:*** la bibliothèque offre son aide à tous les membres qui lui adressent des demandes du genre. Pour les non membres, ce service coûte 5$, tout dépendant des recherches exigées.

— ***nouvelles acquisitions:*** tous les mois, le *Journal* mentionne les nouveaux titres acquis par la bibliothèque. À l'exception des revues, tous les livres de la bibliothèque peuvent être empruntés par les membres. Pour les non membres, chaque emprunt coûte 5$. Ci-dessous se trouve une liste des ouvrages acquis par la bibliothèque et signalés dans le *Journal* depuis janvier 1982.

1. Ad Hoc Committee on National Health Strategies. *Report.* Ottawa: the Committee, 1982. 22p. 1 copy. Bilingual.
2. American Association of Dental Schools. Task Force on Advanced Dental Education. *Advanced Dental Education: Recommendations for the 80's.* Washington: American Association of Dental Schools, 1980. 63p. 2 copies.
3. American Fund for Dental Health. National Dental Quality Assurance Advisory Committee, *Dental Quality Assurance Terminology: a Glossary.* Chicago: American Fund for Dental Health, 1980. 19p. 1 copy.
4. _____. *National Dental Quality Assurance Program: Funded Projects: December 1976 -November 1979.* Chicago: American Fund for Dental Health, 1980. 14p. 1 copy.
5. _____. *Proceedings of a Workshop . . . June 29, 1979.* Chicago: American Fund for Dental Health, 1979. 131p. 1 copy.
6. Arthur Young & Company. *Investigation of the Application of Computer Technology to Private Dental Practice.* Hyattsville, Md.: U.S. Department of Health and Human Services, 1977. 147p. 1 copy.
7. Ash, Stephen B. *Consumer Satisfaction, Dissatisfaction and Complaining Behaviour: Major Findings and Directions for Action.* Ottawa: Supply and Services Canada, 1980. 51p. 1 copy.
8. Bagley, Robin F. *User Changes for Health Services.* Toronto: Ontario Council of Health, 1979. 308p. 1 copy.
9. Banks, Peter. *Killey's Fractures of the Mandible.* Bristol: Wright-PSG, 1983. 117p. 1 copy.
10. Baum, Lloyd, Ralph W. Phillips and Melvin R. Lund. *Textbook of Operative Dentistry.* Toronto: W.B. Saunders, 1981. 580p. 2 copies.
11. Bell, Welden C. *Clinical Management of Temporomandibular Disorders.* Chicago, Ill.: Year Book Medical Publishers, 1982. 231p. 1 copy.
12. Bosmijian, C. Perry. *Personalized Guide to Stress Evaluation.* Toronto: Mosby, 1982. 101p. 1 copy.
13. Burkhardt, Arne and Maeker, Reinhard. *A Colour Atlas of Oral Cancers.* Chicago, Ill.: Year Book Medical Publishers, 1981. 186p. 1 1 copy
14. Canada. Health and Welfare Canada. *The Effects of Customs Tariffs on the Cost of Providing Dental Care in Canada.* Ottawa: Supply and Services, 1983. 123p. 2 copies in English; 2 copies in French.
15. _____. *The Health of Canadians: Report of the Canada Health Survey.* Ottawa: Supply and Services, 1981. 236p. 2 copies.
16. _____. *National Health Research and Development Program Projects Guide* 1983. 27p. 1 copy. Bilingual.
17. _____. *Periodic Health Examination: Report of a Task Force to The Conference of Deputy Ministers of Health.* Ottawa: Supply and Services, 1980. 194p. 1 copy.
18. _____. Bureau of Nutritional Services. *Nutrition and Health in Canada: 1979.* Ottawa: Health and Welfare Canada, 1979. 190p. Bilingual.
19. _____. Health Information Division. *Canada Health Manpower Inventory 1981.* 281p. 3 copies.
20. _____. Health Protection Branch. *Safety Code-20A: X-ray Equipment in Medical Diagnosis: Part A: Recommended Safety Procedures for Installation and Use.* Ottawa: Supply and Services, 1981. 101p. 1 copy. Bilingual.
21. Canadian Dental Association. Council on Education. *Admission Requirements of Canadian Dental Schools, 1982-83.* Ottawa: Canadian Dental Association, 1982. 29p. Available in French and English.
22. _____. *Dental Assisting Education. Accreditation Requirements.* Ottawa: Canadian Dental Association, 1980. 8p. Available in French and English.
23. _____. *Dental Assisting Education. Questionnaire.* Ottawa: Canadian Dental Association, 1980. 17p. Available in French and English.
24. _____. *Dental Hygiene Education. Accreditation Requirements.* Ottawa: Canadian Dental Association, 1980. 11p. Available in French and English.
25. _____. *Dental Hygiene Education. Questionnaire.* Ottawa: Canadian Dental Association, 1980. 34p. Available in French and English.

25. _____. *Dental Undergraduate Programs in Canada. Accreditation Requirements.* Ottawa: Canadian Dental Association, 1980. 6p. Available in French and English.
27. _____. *Dental Undergraduate Programs in Canada. Questionaire.* Ottawa: Canadian Dental Association, 1980. 19p. Available in French and English.
28. _____. *Undergraduate, Postgraduate Dental Hygiene, Dental Assisting, Dental Laboratory Technology Programs in Canada. Handbook Evaluation Procedures.* Ottawa: Canadian Dental Association, 1980. 16p. Available in French and English.
29. Canadian Standards Association. *Alginate Dental Impression Material.* Rexdale, Ontario: the Association, 1982. 22p. 1 copy.
30. _____. *Dental Burs and Cutters — Fitting Dimensions.* Rexdale Ontario: the Association, 1979. 11p. 1 copy.
31. _____. *Dental Casting Gold Alloys.* Rexdale, Ontario: the Association, 1980. 10p. 1 copy.
32. _____. *Dental Inlay Casting Wax.* Rexdale, Ontario: the Association, 1980. 13p. 1 copy.
33. _____. *Diagnostic Electrocardiographs: Minimum Performance Requirements.* Rexdale, Ontario: the Association, 1982. 32p. 1 copy.
34. _____. *Terminology and Definitions Used in CSA Health Terminology Standards.* Rexdale, Ontario: the Association, 1982. 32p. 1 copy.
35. _____. *Tooth Designation for Dental Purposes.* Rexdale, Ontario: the Association, 1980. 8p. 1 copy.
36. _____. *Tracheal Tube Connectors.* Rexdale, Ontario: the Association, 1982. 16p. 1 copy.
37. Chung, David C and Lam, Arthur M. *Essentials of Anesthesiology.* Toronto: W.B. Saunders 1983. 224p. 1 copy.
38. Congress of the International Association of Dentistry for the Handicapped. *Proceedings, Toronto, July 20-25, 1982.* 101p. 5 copies.
39. DeFriese, Gordon, H. *Assessing Dental Manpower Requirements.* Cambridge, Mass.: Ballinger 1982. 157p. 1 copy.
40. Domer, Larry R. *Personalized Guide to Establishing Associateships.* Toronto: Mosby, 1983. 152p. 1 copy.
41. Domer, L.R., Snyder, T.L. and Heid, D.W. *Dental Practice Management: Concepts and Application.* Toronto: Mosby, 1980. 381p. 1 copy.
42. Dunlap, J.E. *Stress, Change and Related Pains.* Tulsa, Okla.: Penn-Well Books, 1981. 229p. 1 copy.
43. Dunlap, J.E. *Surviving in Dentistry: the Sources of Stress.* Tulsa, Okla.: Petroleum Publishing, Publishing Company, 1977. 123p. 1 copy.
44. Felmeister, Charles J. *Personalized Guide to Financial Planning.* Toronto: Mosby, 1982. 122p. 1 copy.
45. Gilmore, H.W. and others. *Operative Dentistry.* 4th ed. Toronto: Mosby, 1982. 379p. 1 copy.
46. Goaz, Paul W. and White, Stuart C., editors. *Oral Radiology, Principles and Interpretation,* Toronto: Mosby, 1982. 695p. 1 copy.
47. Haver, J.F. *Personalized Guide to Marketing Strategy.* Toronto: Mosby, 1983. 120p. 1 copy.
48. Holmes, King K. and Mardh, Per-Anders, editors. *International Perspectives on Neglected Sexually Transmitted Diseases: Impact on Venereology, Infertility, and Maternal Infant Health.* Washington: Hemisphere Publishing, 1983. 336p. 1 copy.
49. Houston, W.J.B. *Walter's Orthodontic Notes.* 4th ed. Bristol: Wright PSG, 1983. 218p. 1 copy.
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New Journal Subscriptions

Acta Odontologica Scandinavica. Oslo, Norway.

Community Dentistry and Oral Epidemiology. Munksgaard. Copenhagen.

International Journal of Oral Surgery. Munksgaard. Copenhagen.

Journal of Cranio-Mandibular Practice. CHROMA. Chattanooga, Tennessee.

Journal of Head and Neck Pathology. Brussels, Belgium.

Journal of Oral Rehabilitation. Blackwell. Oxford, England.

Journal of the Massachusetts Dental Society. Wellesley, Mass.

Audio-Visual Material

The Library has in its collection two Home Study Programs. The titles of the programs are *The Portable Back School* and *Tension Management and Relaxation.* Each set contains two audiocassettes and a book. Anyone who is interested is welcome to borrow them from the Library.

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La bibliothèque a aussi des cassettes portant sur la *Conférence de l'ADC sur l'assurance touchant la qualité des services et la révision professionnelle* qui a eu lieu le 18 novembre 1982.

CDA Resource Centre/Centre de documentation

STRESS AND ANXIETY IN THE DENTAL PATIENT

One copy of the following articles is available at no charge from the library to all CDA memnbers. Non-members will be charged $5. This bibliography was generated with the help of MEDLARS, a computerized information retrieval system for the Health Sciences field, which has been operational at the library since February 1982, and is at the disposal of all members.

STRESS ET ANGOISSE CHEZ LE PATIENT DENTAIRE

La bibliothèque de l'ADC offre gratuitement à ses membres et pour $5 aux non membres une copie des articles suivants. Cette bibliographie a été préparée avec l'aide de MEDLARS, un système informatisé de recherche bibliographiques pour les sciences de la santé. Ajouté à la bibliothèque en février 1982, ce système est à la disposition de tous les membres.

1. Coombs, J.A. *Application of behavioural science research to the dental office setting.* International Dental Journal, v. 30, no. 3, September 1980, pp. 240-248.

   Abstract: The one-to-one intervention between patient and dentist continues to offer significant opportunities for practitioners to impact positively on their patients' oral health behaviour. A growing body of behavioural science research offers suggestions for maximizing opportunities. The practitioner and his staff, developing programs for the improvement of oral health behaviour, should assess the patients' individual dental educational needs, make the educational diagnosis, increase the patient's motivation to achieve the prescribed preventive behaviour and monitor and reinforce the patient's progress toward achieving optimum goals. A concerted effort must be made to reduce the barriers which prevent the patient from obtaining these goals. One of the foremost barriers is dental-related anxiety and fear. Successful anxiety-reducing procedures include: relaxation, modelling desitization, pre-surgical waiting periods, hypnosis and patients' control methods.

2. Donaldson, D. *Anxiety: its management during the treatment of the adolescent dental* patient. International Dental Journal, v. 32, no. 1, March 1982, pp. 44-55.

   Abstract: Surveys indicate that the adolescent, in particular, suffers from acute anxiety in relation to dentistry. This anxiety is promoted by the general opinion they form of dentists and dentistry through portrayal by their peers and the media. In addition, their own attitude to dentistry, both positive and negative, is influenced to a large extent by the dentist himself. This dentist patient relationship is, therefore, especially important when treating the adolescent and this should be emphasized in the dental undergraduate curriculum.

3. Geroge, J.M. and Scott, D.S. *The effects of psychological factors on recovery from surgery.* Journal of the American Dental Association, v. 105, no. 2, August 1982, pp. 251-258.

   Abstract: This paper has reviewed correlational studies from both inpatient hospital settings and outpatient oral surgery that demonstrate that several psychological factors are related to postsurgical recovery. Examination of these factors indicates that dentists might improve patients' recovery by giving the surgery a more positive meaning (making the outcome seem desirable), improving patients' acceptance of their condition, making patients' expectations more positive and, reducing anxiety about recovery.

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Abstract: Avoidant dental patients responding to advertisements offering behavioural treatment for avoidance of dentistry were compared with patients particularly low in dental fear along a number of dimensions. Factors which discriminated between the two groups were: gender, the neuroticism scale of the Essenek Personality Inventory; general self reported reactions to past dental treatment, tolerance for dental (but not non-dental) pain.

9. Lamb, D.H. and Strand, K.H. *The effect of a brief relaxation treatment for dental anxiety on measures of state and trait anxiety.* Journal of Clinical Psychology, v. 36, no. 1, January 1980, pp. 270-274.
Abstract: Used a brief deep muscle procedure to reduce patient (N=39) anxiety during a dental appointment. State anxiety decreased significantly for a relaxed (treated) group from the waiting room period to the actual contact with the dentist. This reduction in state anxiety was maintained for the duration of the dental visit. There were no changes in trait anxiety. Implications for the reduction of state and trait anxiety in an in vivo situation were discussed.

10. Lowental, U. *Stress, anxiety and the dental patient: the missing specification.* International Dental Journal, v. 31, no. 3, September 1981, pp. 193-197.
Abstract: The importance of stress and anxiety as contributing to the complex aetiology of dental disease which were relieved when their psychological causes had been uncovered are described. It is suggested that specialized psychiatric skills are not always necessary in dealing with such cases. The dentist's own personal life experience, his human understanding and his interest in his patients' well-being are usually sufficient. Equal attention must be given to all data in both physical and psychological spheres if the patient's best interests are to be served.

11. Morse, D.R. and others. *Stress, relaxation and saliva: a follow-up study involving clinical endodontic patients.* Journal of Human Stress, v. 7, no. 3, September 1981, pp. 19-26.
Abstract: Dentally induced stress and relaxation-induced anxiety reduction recently have been correlated with salivary changes in private patients treated by a solo endodontist. Hypnosis was shown to be more effective than local anesthesia in anxiety reduction. Dental students and clinic patients were employed in this study in an attempt to replicate the previous findings. One additional salivary variable (pH) was examined. Twenty-nine endodontic clinic patients were treated, each by a different dental student. The patients completed dental anxiety questionnaires and had salivary samples taken prior to, and at the conclusion of their initial endodontic treatments. Pain and anxiety were managed using local anesthesia, hypnosis, or nitrous oxide-oxygen, either alone or in combination. There were significant anxiety-reduction changes by the conclusion of the visits as measured by increased salivary volume, increased salivary translucency, reduced salivary protein, increased salivary pH and reduced questionnaire-determined anxiety level. Hypnosis and nitrous oxide-oxygen were significantly more effective than local anesthesia in anxiety reduction as measured by salivary changes and questionnaires. It can be concluded that saliva is an easily obtained fluid that can be used to determine levels of stress and relaxation.

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Abstract: This study utilized the Dental Anxiety Scale (DAS) in examining 128 pregnant women, aged 15-34. The data indicated that 71% had not been to the dentist within the past year, 58% had made their last visit because of pain, and 36% had presented to the dentist in pain. These patients had a mean of 7.3 tooth surfaces, or almost three teeth, that had been extracted previously. Fillings were almost non-existent in this group of women. The moderately high anxiety scores were anticipated due to the inverse association between socioeconomic status and dental anxiety. However, knowing the anxiety level and needs prior to treatment prepared the operator to use caution and tact during each procedure. This brief test is invaluable in dental treatment situations.

14. Silvestro, J. and Vieson, R.A. *The effect of second dentition on children's dental anxiety and impulsivity-reflectivity.* New York State Dental Journal, v. 49, no. 2 February 1983, pp. 75-76.

15. Wardle, J. *Fear of dentistry.* British Journal of Medical Psychology, v. 55, (Pt. 2) 1982, pp. 119-126.
Abstract: Patients attending the primary care department of a London dental hospital and a suburban general practice were interviewed to explore their experience of and reasons for anxiety about dental treatment. Results showed that anxiety was at a high level, particularly concerning treatment procedures. The most common reason given for fear was anticipated pain, and this was borne out by a comparison

between anxiety and expected pain for a number of dental procedures. The possibility of mitigating dental fear by procedures which focus on minimizing pain expectations and pain experience is discussed.

16. Weiner, A.A., Moore, P.A., and Sheehan, D. *Current behavioral modes of reducing dental anxiety.* Quintessence International, v. 13, no. 9, September 1982, pp. 981-985.

17. Winer, G.A. *A review and analysis of children's fearful behavior in dental settings.* Child Development, v. 53, no. 5, October 1982, pp. 1111-1133.

Abstract: This paper is a review of the empirical literature dealing with the fearful responses of normal children to dental experiences. The first part of the paper reviews four major ways of measuring children's fearful behavior, namely, through behavioral rating scales, self-report measures, projective techniques, and physiological measures. The next section of the paper, dealing with incidence of dental fear and age changes, makes the point that disruptive dental behaviors are seen in relatively few children, with marked diminutions in anxiety occurring in the preschool years. Correlates of dental anxiety and experimental studies of dental fear are reviewed in the final portions of the paper.

NEW LIBRARY ACQUISITIONS

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TITRES EN BIBLIOTHÈQUE

Les titres indiques ci-dessous sont maintenant disponibles à la bibliothèque/centre de documentation à la membres de l'ADC, sans frais. La coute pour les autres est 5$.

1. *The Relationship of Intraoral Protective Devices to Athletic Injuries and Athletic Performance.* Conference held June 25-26, 1982. W.K. Kellogg Foundation Institute, Graduate and Postgraduate Dentistry. The University of Michigan, School of Dentistry, Ann Arbor, Michigan. 150p. 1 copy.

2. Wyman, R.J. *The Posterior Composite Resin Restoration: Winning at Restorative Dentistry Without Mercury.* Toronto: Marplax, 1983. 109p. 1 copy.

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Publications

Dental Laboratory Procedures: Fixed Partial Dentures (Vol. 2)

Harold F. Eissmann, Kenneth D. Rudd and Robert M. Morrow

C.V. Mosby Company
St. Louis, MO.
$37.50, 367 pgs,

(illustrated, hard cover)

Fixed Partial Dentures is the second volume in a series of three texts by the same authors dealing with Dental Laboratory Procedures. Volume One focuses on complete dentures, Volume Three on removable partial dentures. In each volume, the authors have utilized contributions from a number of respected experts.

In the field of prosthodontics, laboratory procedures are routinely performed by dentists, dental assistants and dental technicians. Understanding and communication between the dentist and the auxillaries is essential if the patient is to be treated efficiently and optimally.

With this in mind, the authors and some twenty contributors have set about to present sound laboratory procedures that are employed in the fabrication of a variety of fixed dental restorations. This information is coupled with theoretical background material in an attempt to orient the reader in basic design principles. In addition, this book strives to contribute to a greater awareness and understanding of both the dentists and technicians' clinical and technical responsibilities.

Fixed Prosthodontics is a cumulative discipline where one procedure builds upon another. The first nine chapters, therefore, deal with a normal sequence of clinical treatment starting with diagnostic procedures and ending with finishing techniques. In between, the subjects of tooth preparation, impression materials, working casts, articulation, occlusion and retainer fabrication are covered. The remaining eight chapters focus on associated topics that are very important, albeit peripheral to the clinical progression.

They include material relating to pontic and framework design, attachments, cosmetics, visual perception and tooth contour, soldering treatment appliances and finally, repair techniques.

In the chapter on Diagnostic Procedures, the fabrication of diagnostic casts and their utilization is handled in a very helpful, lucid and concise manner. Examples of their application in study and treatment planning, along with a problem, cause and solution section on the handling of materials and equipment are well presented.

Next, the chapter on Tooth Preparation describes designs for various preparations with some correlation between important preparation details and ultimate clinical serviceability subsequent to the fabrication and insertion of the prosthesis.

The section on Impression Materials and Techniques covers virtually all the materials that are presently available along with their advantages and disadvantages. Some of the more common problems encountered in their use are discussed in addition to an easy reference section on the probable cause of problems and possible solutions.

A chapter on the fabrication of working casts and dies follows and is well done. Since the final restoration can only be as accurate as the working cast on which it is constructed, the material presented in this section should be thoroughly understood by clinician, auxilliary and technician.

The mounting of working casts on various articulating devices is dealt with next. The importance and proper handling of interocclusal records is emphasized. Accuracy at this clinical stage, as well as in the subsequent mounting of master models is discussed and will minimize time required for later chairside adjustments.

The subject of wax pattern fabrication is handled in five parts. The material on tooth morphology includes articulation and occlusal morphology, followed by functional waxing, axial contouring and finally marginal adaptation.

The by now familiar "problem, cause and solution" table at the end of the last section is again very helpful. While the sheer volume of material in this chapter renders it somewhat unwieldy, it does succeed in establishing the very important link between biomechanics, form and function.

Investing, casting and finishing techniques round out the first half of the text where a miriad of details are presented that one must keep in mind and under control if a well fitting final restoraiton is to be achieved. Meticulous attention to detail is the password here and many valuable tips are shared.

The remaining part of the book concentrates on areas of technical importance which are not readily inter-connected and as a result, reading continuity is somewhat diminished.

The book ends with chapters on soldering procedures, diagnostic and treatment appliances and repair techniques. While each of these chapters provides the reader with valuable material, the information on diagnostic and treatment appliances is particularly timely, given the current interest in the treatment of the occlusally and often periodontally unstable dentition.

In conclusion, the authors are to be congratulated for their attempt to chart a course between the chair and the bench. One would have to give them an "A" for effort, for the waters in which they navigate are anything but calm. Charts on the handling of problem areas are well executed, easily readable, and good references. One's main criticism comes in the

continued on next page

Hampson's Textbook of Operative Dentistry (4th Ed.)

E.L. Hampson

William Heinemann Medical Books Ltd.
London, England
£13.75 (U.K.), 234 pages

This text, which was published originally in 1961, covers a wide range of subjects including general principles of cavity preparation, isolation of teeth from moisture, amalgam restorations, silicate restorations, resin restorations, gold inlays, desensitizing teeth, and pulp diseases. The text is an excellent introduction for the novice dentist.

The book is well written, is easy to comprehend and has numerous excellent photographs and diagrams.

If the book has a flaw, it is that it tries to cover too many topics in too short of a space. Further, upon looking at the bibliography at the end of each chapter it is found to be very sparse indeed. This writer would definitely recommend the text to anyone who wanted a quick update or refresher on some basic principles of operative dentistry. Also, it is a text which is very well suited for the first year dental student just being exposed to some of the basic principles of operative dentistry.

However, for the advanced practitioner, this book would not serve a useful purpose in one's dental library. A more advanced text devoting greater amounts of space to the various treatment areas as well as having a more varied approach would be more beneficial.

This book was reviewed by Murray Viny, DMD, Calgary, Alberta.

Dental Laboratory Procedures . . .

second half of the text where subject matter and flow make it difficult to maintain reading continuity and enthusiasm.

The individual truly interested in the "quality prostheses" will appreciate this book.

This book was reviewed by W.R. Teteruck, Chairman, Division of Fixed Prosthodontics, and D.R. Gratton, Coordinator, Clinical Restorative Dentistry, Faculty of Dentistry, University of Western Ontario.

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CDA committee report: applicants to canadian dental schools 1982-1983 who are they? what are they like?

The D.A.T. Committee*

INTRODUCTION

In 1982, the Dental Admission Test Committee (DAT) of the Canadian Dental Association added a questionnaire to the Dental Admission Test Program concerning the biographical background of the applicants to dental school. Because all dental schools in Canada require the Dental Admission Test, the data from this questionnaire has become a new source of national and provincial information on all applicants. This type of information could prove valuable in possible future thrusts in recruitment, analysis of practice location and choice of practice type. The following article will report on different biographical and demographic variables of students who could have applied to the faculties for admission in the 1983-84 academic year.

*Dr. M. Boyd, Chairman; Dr. D. Banting; Dr. I.C. Bennett; Dr. J.W. Graham; Dr. G.W. Thomson are DAT Committee members.

INTRODUCTION

En 1982, le Comité du Test d'admission de l'Association dentaire canadienne a ajouté un questionnaire au test pour obtenir des renseignements touchant les antécédents des candidats qui veulent poursuivre des études en dentisterie. Parce que toutes les écoles dentaires canadiennes exigent que les candidats se soumettent au Test d'admission, les données recueillies à partir de ce questionnaire sont devenues une nouvelle source de renseignements touchant les candidats du pays entier et de chacune des provinces. Ces renseignements pourront se révéler utiles à l'avenir pour le recrutement, l'étude d'une région particulière et le choix du service dentaire qui lui convient. L'article suivant fait état des diverses variables biographiques et démographiques des étudiants qui auraient pu demander d'être admis dans les écoles dentaires pour l'année 1983-1984.

TABLE 1

Sex Identification of Dental School Applicants

1983 — 1984 Academic Year

	Alberta	British Columbia	Manitoba	New-Brunswick	New-Foundland	Nova Scotia	Ontario	Prince Edw. Island	Quebec	Saskatchewan	Total	Percent
Male	106	65	45	11	2	39	327	2	249	26	862	64.3
Female	30	23	18	3	0	17	159	0	210	19	479	35.7
Total	**136**	**78**	**63**	**14**	**2**	**56**	**486**	**2**	**459**	**45**	**1,341**	

Missing Data 91

TABLE 2

Ethnic Identification of Dental School Applicants

1983 — 1984 Academic Year

	Alberta	BC	Manitoba	New Brunswick	New Foundland	Nova Scotia	Ontario	PEI	Quebec	Saskatchewan	Total	Percent
White	87	34	45	14	2	51	265	1	382	30	911	69.9
Pacific Island	14	5	5	0	0	1	26	0	17	1	69	5.3
American Indian	0	0	2	0	0	0	0	0	0	0	2	0.2
Indian	1	1	1	0	0	0	16	0	1	1	21	1.6
Black	3	0	1	0	0	1	7	0	5	0	17	1.3
Asian	22	32	7	0	0	1	76	0	27	9	174	13.4
European	2	3	2	0	0	1	64	1	13	2	88	6.8
Other	4	0	2	0	0	1	8	0	2	0	15	1.2
Total	**133**	**76**	**63**	**14**	**2**	**56**	**467**	**2**	**447**	**43**	**1,303**	

Missing Data 129

SEX, ETHNIC IDENTIFICATION and CITIZENSHIP

Table 1 reports, by province, the sex of the applicants. There were 862 or 64.3 per cent male and 479 or 35.7 per cent female applicants. In general, Alberta seemed to have a somewhat less than average number of female applicants (22.1 per cent) while Quebec (45.8 per cent) and Saskatchewan (42.2 per cent) has a higher than average number of female applicants. **Table 2** reports the race of the applicants by province. For the whole of Canada, there are 69.9 per cent white, 5.3 per cent Pacific Islander, 0.2 per cent American Indian, 1.6 per cent Indian, 1.3 per cent Black, 13.4 per cent Asian, 6.8 per cent European and 1.2 per cent other. British Columbia has a lower than average number of White applicants (44.7 per cent) while Quebec has a higher than average (85.5 per cent). This probably follows from the fact that both these provinces have either an above or a below average number of Asian applicants (British Columbia 42.1 per cent and Quebec 6.0 per cent). Ontario has a larger than average number of European applicants. Outside of these exceptions, all provinces seem to have an average mix of applicants by race.

There are 1,219 (85 per cent) Canadian, 86 (6.0 per cent) landed immigrants, 15 (1.1 per cent) student visa and 3 (0.2 per cent) in another category. An examination of the cross tabulation of this distribution with that of provinces indicated that province did not create a significant difference in this category. **Table 4** reports the language preference for instruction of dental school applicants. The French language is preferred by 299 (22.5 per cent), the English language by 946 (77.1 per cent) while 85 (6.4 per cent) would be equally satisfied with either language. It is interesting to note that although 34.2 per cent of all the applicants are from Quebec, only 22.5 per cent of all applicants preferred the French language.

TABLE 4

Language Preference for Instruction of Dental School Applicants

1983 — 1984 Academic Year

	Number	Percent
French	299	22.5
English	946	71.1
Either	85	6.4
Total	**1,330**	

Missing Data 102

TABLE 5

Size of Residence in High School

1983 — 1984 Dental School Applicants

	Number	Percent
Farm	16	1.2
Under 2,500	69	5.3
2,500 — 24,999	230	17.6
25,000 — 99,999	296	22.7
100,000 — 999,999	366	28.0
Over million	330	25.3
Total	**1,307**	

Missing Data 125

TABLE 6A

Future Practice Location

1983 — 1984 Dental School Applicants

	Number	Percent
Remote Area	110	8.4
Rural Area	220	16.7
Medium City	693	52.7
Large Metro.	276	21.0
Total	**1,316**	

Missing Data 116

TABLE 6B

Future Practice Location of Dental School Applicants

	Alberta	BC	Manitoba	New Brunswick	New Foundland	Nova Scotia	Ontario	PEI	Quebec	Saskatchewan	Total	Percent
Large Metro	35	16	13	0	0	3	111	0	97	1	276	20.9
Medium City	75	39	38	11	1	30	253	1	211	34	693	52.6
Rural	18	19	8	3	1	21	83	1	57	9	220	16.7
Remote	5	3	3	0	0	1	24	0	73	1	110	8.4
Total	**134**	**77**	**63**	**14**	**2**	**56**	**473**	**2**	**450**	**45**	**1,299**	
Missing Data 17												

SOCIO-ECONOMIC BACKGROUND

Table 5 reports the size of the applicant's residence at time of high school. There are 16 (1.2 per cent) from farm, 69 (5.3 per cent) from an area with a population under 2,500, 230 (17.6 per cent) from an area under 25,000, 296 (22.7 per cent) from an area under 100,000, 366 (28.0 per cent) from an area under 1 million and 330 (25.3 per cent) from an area over 1 million. **Table 6A** reports the future practice location for dental school applicants. One hundred and ten (8.4 per cent) prefer a remote area, 220 (16.7 per cent) a rural area, 693 (52.7 per cent) a medium size city and 276 (21.0 per cent) a large metropolitan area. It is interesting to compare **Table 5** with **Table 6A.** It seems that there is a slight shift downward. Applicants seem to prefer to practice in an area somewhat smaller than where their parents lived when they were in high school. In general, British Columbia (24.9 per cent) and Nova Scotia (37.5 per cent) had a higher than average number of applicants who indicated future practice location in a rural area, while Quebec (16.2 per cent) indicated a higher than average number preferring a remote area for their practice location.

The parent's education of dental school applicants is seen in **Table 7**. An examination of the Table indicates that 52 per cent of the fathers and 37 per cent of the mothers attended college. In general, the fathers seemed to have pursued somewhat more advanced education than the mothers. **Table 8** reports the parent's occupation of the applicants. Naturally, this table will be highly correlated with **Table 7**. Sixty five (4.9 per cent) of the applicants' fathers are dentists, while 4 (0.3 per cent) of their mothers are dentists. Fifty eight (4.4 per cent) of their fathers are physicians while 14 (1.1 per cent) of their mothers are physicians. Other occupations which rated high for fathers are accountants/brokers (52), engineers/chemists (108), executives (64), government service (68) owner/manager (163), salesperson (57), skilled worker (190), and teacher/professor (84). Occupations which rated high for mothers are housewife (441), salesperson (59), skilled worker (71), and teacher/professor (95).

TABLE 7

Parents Education of Dental School Applicants

1983 — 1984 Academic Year

	Father		Mother	
Graduate Degree	344	26.4	134	10.2
Some Graduate School	50	3.8	51	3.9
Bachelors Degree	130	10.0	115	8.8
Some College	155	11.9	190	14.5
High School Graduate	223	17.1	422	32.1
Some High School	218	16.7	408	15.8
Elementary Education	138	10.6	155	11.8
Unknown	47	3.6	39	3.0
Total	**1,305**		**1,314**	
Missing Data	127		118	

Table 9 reports the combined income of parents of dental school applicants. Four hundred and two (32.1 per cent) have an income of less than $30,000, 455 (36.4 per cent) have an income between $30,000 and $50,000, 218 (17.4 per cent) have an income between $50,000 and $70,000 and 175 (14.0 per cent) have an income over $70,000.

COLLEGE PREPARATION

The amount of predental education of applicants at the time of participation in the Dental Admission Test Program is reported in **Table 10**. Three hundred and ninety-seven (33.4 per cent) have completed 1 year college, 316 (26.6 per cent) 2 years of college, 192 (16.1 per cent) 3 years of college, 77 (6.5 per cent) four years of college, 165 (13.9 per cent) have a bachelor of arts degree and 27 (2.2 per cent) have done graduate work. **Table 11** shows the college major of the dental school applicants. There are four majors which account for the majority of applicants;

namely, Biochemistry (114), Biology (466), Chemistry (192), and Social Science (272). It is interesting to note that there are 86 applicants (5.5 per cent) with a major in Pre-medicine. An examination on **Table 12** indicates that 280 (19.6 per cent) of the Dental School applicants participated in the Medical College Admission Test (MCAT). This could mean that one out of five applicants to dental school are also applying to Medical School.

The majority of applicants (913 or 70.6 per cent) do not anticipate financial indebtedness upon entering Dental School. Another 23 per cent will have a debt of less than $5,000. The largest source of financial aid will be parental assistance, followed next by self-spouse assistance. Loan/scholarship accounts for a less important source of assistance.

Table 13 reports the number of applications an applicant intends to file by province of residence. Forty three percent of the applicants intend to file one application while another 27.7 per cent intend to file only two applications. An examination of the table indicates, as one would expect, that applicants from provinces with only one dental school tend to file fewer applications than those with more than one school.

TABLE 8

Parents Occupation of Dental School Applicants

1983 — 1984 Academic Year

	Father		Mother	
Account/Banker	52	3.9	32	2.4
Architect	7	0.5	0	0.0
Artist/Musician	4	0.3	8	0.6
Dentist	65	4.9	4	0.3
Dental Technician	4	0.3	3	0.2
Engineering/Chemist	108	8.1	4	0.3
Executive	64	4.9	21	1.6
Farmer	31	2,3	6	0.5
Fisherman	1	0.1	1	0.1
Government Service	68	5.2	19	1.5
Housewife	0	0.0	441	33.6
Lawyer	9	0.7	3	0.2
Nurse	3	0.2	78	5.9
Owner/Manager	163	12.4	55	4.2
Pharmacist	10	0.8	6	0.5
Physician	58	4.4	14	1.1
Salesperson	57	4.3	59	4.5
Skilled Worker	190	14.4	71	5.4
Stenographer	0	0.0	34	2.5
Teacher/Professor	84	6.4	95	7.3
Unskilled Worker	52	3.9	40	3.1
Veterinarian	5	0.4	1	0.1
Other	284	21.5	303	23.1
Total	**1,319**		**1,313**	
Missing Data	113		119	

FUTURE PRACTICE PLANS

Table 14 reports the anticipated future practice plans of these Dental School applicants. The survey was not mutually exclusive so that an applicant could choose more than one category. It is interesting to note that 550 applicants indicated, as one would expect, that they intend to enter private practice. Another 180, however, plan careers in orthodontics and 166 careers in oral surgery. For the number who eventually specialize in these areas, this number seems rather high. The majority of these come

TABLE 9

Combined Income of Parents of Dental School Applicants

1983 — 1984 Academic Year

	Number	Percent
$0 —9,999	50	4.0
$10,000 — 19,999	123	9.8
$20,000 — 29,999	229	18.3
$30,000 — 39,999	258	20.6
$40,000 — 49,999	197	15.8
$50,000 — 59,999	135	10.8
$60,000 — 69,999	83	6.6
$70,000 — 100,000	118	9.4
Over $100,000	57	4.6
Total	**1,250**	
Missing Data 182		

TABLE 10

Pre-Dental Education of Dental School Applicants

1983 — 1984 Academic Year

	Number	Percent
1 Year of College	397	33.4
2 Years of College	316	26.6
3 Years of College	192	16.1
4 Years of College	77	6.5
Bachelors Degree	165	13.9
Masters Degree	23	1.9
Doctor Degree	4	0.3
Other	2	0.2
Total	**1,190**	
Missing Data 242		

TABLE 11 College Major of Dental School Applicants 1983 — 1984 Academic Year		
	Number	Percent
Anthropology	6	0.4
Biochemistry	114	7.3
Biology	466	29.8
Business	7	0.5
Chemistry	192	12.3
Dental Hygiene	17	1.1
Economics	9	0.6
Education	10	0.6
Engineering	17	1.1
Fine & Applied Arts	7	0.5
History	9	0.6
Language/ Literature	10	0.6
Mathematics	64	4.1
Microbiology	83	5.3
Nursing	7	0.5
Pre-Dentistry	18	1.2
Pre-Medicine	86	5.5
Pharmacy	48	3.1
Physiology	4	0.3
Phychology	39	2.5
Social Science	272	17.4
Zoology	7	0.5
Other	73	4.7
Total	1,565	

TABLE 12 Participation of Dental School Applicants in The Medical College Admission Test (MCAT) 1983 — 1984 Academic Year		
	Number	Percent
MCAT	280	19.6
NO MCAT	1,152	80.4
TOTAL	1,432	

from three provinces; namely, Alberta, Ontario and Quebec. **Table 6A,** reported above, indicates in future practice location of Dental School applicants. As indicated earlier, there appears to be a slight shift downward for intended practice location with slightly smaller areas than areas of parent's residence.

SUMMARY AND DISCUSSION

In the 1982-83 data pool there are approximately 2 male applicants (63.4 per cent) to every female applicant (35.7 per cent). The majority are white (69.9 per cent) and Canadian citizens (92.1 per cent). There are, however, 12.4 per cent) Asians. Seventy one percent of the applicants prefer classes taught in English, 22.5 per cent in French, while 6.4 per cent would accept either language. The majority of applicants (53.3 per cent) come from residences over 100,000 in population, while 6.5 per cent come from areas with a population of less than 2,500. There appears, however, to be a shift downward for intended practice locations with slightly smaller areas than area of parent's residence. Fifty two percent of the fathers and 36 per cent of the mothers of the applicants attended college. Fathers appear to have undertaken more formal education than mothers. Sixty five (4.9 per cent) of the applicants fathers are dentists, while 4 (0.3 per cent) of their mothers are dentists. The medium combined income of parents is between $30,000 and $39.000.

The majority (61.1 per cent) of the applicants are in their second year of university or college. The most frequently reported majors are Biochemistry (114), Biology (466), Chemistry (192), and Social Science (272). About one out of five applicants seem to be applying to Medical School. Most applicants (70.6 per cent) will be entering Dental School without any financial debt and the main source of financial aid during Dental School will be parents, but self financial help is about equally as strong a source. Loans, scholarships and other means are of less importance. The majority of applicants (70.9%) will file applications at two or less schools.

In summary, this article has reported a profile of those potential Dental School applicants for the 1983-84 academic year. Although it does not reflect data on those actually admitted, it has been shown in the American Dental Association DAT program research that the group admitted parallels the applicant pool.

ACKNOWLEDGEMENT

This is a Report of the DAT Committee for information purposes only. The Committee would like to thank Dr. James Graham, Director of Data Processing at the American Dental Association for his contribution in data analysis.

TABLE 13

Number of Applications made to Dental School

1983 — 1984 Academic Year

	Alberta	BC	Manitoba	New Brunswick	New Foundland	Nova Scotia	Ontario	PEI	Quebec	Saskatchewan	Total	Percent
1	85	38	48	4	1	27	195	0	115	41	554	43.1
2	11	7	7	1	0	7	139	2	180	2	356	27.7
3	19	10	4	3	0	9	55	0	87	1	188	14.6
4	7	10	3	6	0	8	47	0	39	0	120	9.3
5	2	6	0	0	1	1	16	0	8	0	34	2.6
6 or more	3	4	0	0	0	1	15	0	9	0	32	2.5
Total	**127**	**75**	**62**	**14**	**2**	**53**	**468**	**2**	**440**	**44**	**1,287**	

Missing Data 145

TABLE 14

Future Practice Plans of Dental School Applicants

1983 — 1984 Academic Year

	Alberta	BC	Manitoba	New Brunswick	New Foundland	Nova Scotia	Ontario	PEI	Quebec	Saskatchewan	Total
Private Practice	62	47	19	8	2	32	117	0	184	25	550
Armed Service	6	2	3	1	0	4	13	0	11	0	40
Dental Education	0	1	2	0	0	1	17	0	12	2	35
Dental Research	7	2	5	1	0	0	34	1	20	0	70
Public Health	12	6	3	0	0	1	34	0	59	2	117
Orthodontics	19	8	4	4	0	5	53	0	76	11	180
Oral Surgery	26	4	10	2	0	5	64	0	54	1	166
Prosthodontics	1	0	1	0	0	0	3	0	2	0	7
Endodontics	2	2	3	0	0	0	4	0	1	1	13
Pedodontics	5	0	2	0	0	2	17	0	20	4	50
Periodontics	1	1	1	0	0	0	12	0	2	0	17
Oral Pathology	4	0	0	0	0	1	3	0	5	1	14
Oral Radiology	0	0	0	0	0	0	2	0	2	0	4
Dental Public Health	1	1	2	0	0	0	12	0	20	1	37
Undecided	32	18	18	2	0	15	142	1	105	11	344

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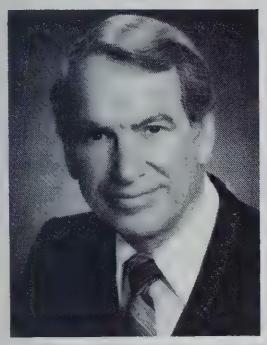
British Columbia's Medical Services Act — some disquieting implications



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INTRODUCTION

The Government of British Columbia, in an expressed intent of reducing governmental spending, has made public a plethora of potential statutes designed to achieve legislative endorsement of its proposals. One of these, Bill 24, the Medical Services Act, has not had the public attention it deserves because it has largely been obscured by the volatility which has surrounded — indeed enmeshed — the bills which would so drastically reduce the number of civil servants in Canada's most westerly province. And what public attention the Medical Services Act has experienced has almost exclusively been directed to the implications for physicians. Notwithstanding the name of the proposed statute, its provisions extend beyond only those licensed to practise medicine in British Columbia. The dental profession is just as surely included — both actually and precedentally — as if it had been specifically named in the title of the Bill. It is not until one reaches Section 53 that it becomes clear that, concerning the operation and administration of the plan, the Cabinet may make a host of regulations including "the provision of dental care services and benefits to residents or any designated category of residents including the specifying of those provisions of the (Medical Services Act) and the regulations respecting the plan which apply or do not apply to the provision of dental care services and benefits."

INTRODUCTION

Le gouvernement de Colombie Britannique, dans sa tentative déclarée de réduction des dépenses gouvernementales, a publié une pléthore de projets de lois destinés à donner un statut légal à ses propositions. L'un de ces textes, le Bill 24, le Medical Services Act (la Loi sur les services médicaux), n'a pas reçu du public l'attention qu'il méritait, parce qu'il a été éclipsé par la publicité qui a accompagné — et en fait englouti — les projets de lois destinés à réduire dramatiquement le nombre de fonctionnaires dans cette province de l'Ouest du Canada. Et l'attention que le public a accordée à cette Loi sur les services médicaux a été presqu'exclusivement consacrée aux implications qu'elle avait pour les médecins. Cependant, malgré son titre, les dispositions de cette Loi ne s'appliquent pas uniquement à ceux qui ont le droit d'exercer la médecine en Colombie Britannique. Elles s'appliquent également aux dentistes — en principe aussi bien qu'en fait — exactement comme s'ils figuraient dans le titre du projet de loi. Ce n'est que lorsqu'on atteint l'article 53 que l'on se rend compte que, en matière d'administration et de fonctionnement du régime, le Cabinet a le pouvoir d'adopter un grand nombre de règlements, parmi lesquels "la fourniture de bénéfices et de services de soins dentaires aux résidents ou à toute autre catégorie de résidents spécifiée, y compris la spécification des dispositions de la (Loi sur les services médicaux) et des règlements relatifs au régime qui s'appliquent ou ne s'appliquent pas à la fourniture de bénéfices et de services de soins dentaires.

DISCUSSION

The Medical Services Act, given First Reading on July 7, 1983, is intended to repeal and replace the **Medical Service Act** and the **Medical Service Plan Act, 1981.** The Medical Services Commission, existing under the earlier

statutes, is continued but its power and authority have been considerably enlarged and strengthened. It may issue and restrict practitioner billing numbers, the significance of which will be commented on, later. The Commission has enhanced authority to establish and modify payment schedules for different practitioners and different classes of practitioners. For all practitioners billing under the plan, there is an extension of the prohibition against balance billing, extra billing, or extra charging. The Commission has been given explicit authority to refer, for the purpose of inquiry, a matter respecting a medical practitioner to the College of Physicians and Surgeons. There are broad inspection powers concerning the administration of the plan and new mechanisms are established for recovery of amounts paid by the plan. There has been a clarification of the authority to approve laboratories and diagnostic facilities and to establish the terms and conditions for their approval.

There are two provisions in the "Interpretation" section of the bill which clearly provide for the inclusion of services residing within the legal competence of dentists to render. In addition to a general provision that "insured services" means "all services rendered by a medical practitioner that are **medically required** (emphasis added) except prescribed services," to which attention is to be given in the regulations, it means, as well, "prescribed health care services and benefits rendered by a practitioner other than a medical practitioner." A "practitioner" is a person who "is lawfully entitled to render insured services in the place where the services are rendered." Of great import is the fact that certain services lying within the jurisdictional competence of medical practitioners also rest in the legal capacity of dentists — particularly oral and maxillofacial surgeons — to perform. There are at least twenty to twenty-five such "medically-necessary" (whatever that is assumed to mean) surgical procedures which are compensable whether they be performed by an appropriately qualified medical surgeon or an appropriately qualified oral and maxillofacial surgeon. And it would defy every conceivable tenet of public policy, if, in the expenditure of public funds, one group of legally-qualified practitioners could be remunerated for their "medically necessary" services but another group of legally-qualified practitioners were not similarly treated. If, jurisprudentially, this issue were ever debatable, Canada's Charter of Rights and Freedoms would, to-day, give short shrift to such an untenable contention. Make no mistake; dentistry's feet — whether willingly or unwillingly — are firmly planted in the soil of Bill 24.

Part I

Part 1 of the Medical Services Act outlines, in relatively definitive language, the purpose and authority of the Medical Services Commission. It is responsible to the government for the administration and operation of the plan. Among its almost limitless powers — some of which, of course, require the approval of Cabinet — is the authority to "establish a payment schedule for the payment of insured services and (it) may establish different payment schedules for different practitioners or different classes of practitioners." Although the proposed legislation does not preclude the Commission from entering into consulation or negotiation with the voluntary provincial bodies of the particular practitioners concerned, it does not provide for it either. The Commission can function entirely unilaterally. And does this provision enable the Commission to establish one fee if the service is performed by a medically-qualified surgeon and perhaps a lower one if the identical service is given by the surgeon licensed under the Dentists Act? It would seem so. But, again, what does that do to the discriminatory circumscriptions of the Charter of Rights and Freedoms?

The commission also can "determine whether a service rendered by a medical practitioner is medically required." Given the clauses in the interpretation section referred to earlier, this authority would clearly apply to any practitioner providing insured services pursuant to the statute. What mechanism is to be put in place to permit the Commission to determine if the treatment rendered or proposed is "medically required"? The bureaucratic peregrinations implicit in this provision are almost staggering to contemplate. The nature of any such system is that, at least until the advanced stages of the appellate process have been reached, "medical-necessity" decisions will be clerically adjudicated.

Section 6 of Part 1 provides that the "commission may require the council or executive committee of the College of Physicians and Surgeons of British Columbia to cause an inquiry committee to inquire under Section 50 of the ***Medical Practitioners Act*** into a charge or complaint made by the commission against a medical practitioner." If it is contended that, notwithstanding the provision in the Bill for practitioners other than licensed physicians, the language of Section 6 is so specific that the Commission does not have similar authority concerning dentists under the ***Dentists Act*** then, quite clearly, there will be a legislative amendment to overcome what can be no more than an oversight in the drafting of the legislation. The intention is clear.

No responsible practitioner, irrespective of the profession of which he or she is a member, should contend that allegedly substandard service, service which, to a reasonable person, seems to give evidence of a practitioner failing in a duty of care to the patient, should not experience the conscientious attention of the appropriate licensing body. But the scope of the authority of the Commission is without limit. It may *require* the College to inquire into any charge or any complaint the Commission decides to make against a practitioner licensed by the College.

Part 2 specific to the plan

Part 2 of the Bill is specific to the plan itself. The plan

existing under the ***Medical Service Act*** is "continued for the purpose of providing voluntary insurance against the costs of insured services on a non-profit basis or uniform terms and conditions to all residents in accordance with this Act and regulations."

The Bill provides for consignment inasmuch as "an insured person is entitled to payment on his behalf, or to himself, for insured services. . . ." Although the Commission may waive part of the premium for a specified period, the plan is to be financed primarily through premiums, the Commission being required to "fix premium rates for insured persons." It may, too, "establish different rates for different classes of insured persons." An escape clause is to be found in Section 41. The Commission is required to pay all expenditures necessary for the operation and maintenance of the plan firstly from funds remitted to it as premiums. Secondly, however, provision is made for funds being advanced to the Commission by the Minister of Health" from an appropriation established for the purpose."

Provisions are Orwellian

The implications of the "billing numbers" provision are Orwellian. The commission may — or, even more importantly, perhaps, may not — "grant a billing number under the plan to a practitioner and may impose conditions on the granting of the billing number." Quite simply, a practitioner cannot be paid from the plan without a billing number and a billing number cannot be acquired unless the practitioner meets the imposed conditions.

A practitioner can decide to submit the claim for payment directly to the commission in the form and manner required. Or the practitioner may elect to claim payment from the insured person directly. But the practitioner cannot do both. If direct billing to the patient is elected then the practitioner is precluded from submitting claims to the commission unless and until the practitioner, in writing, revokes that method. Practitioners, who, in principle, (and, perhaps, in conformity with the policy position of their professional associations) may be antipathetic to consignment cannot depart from that principle when they encounter patients in respect of whom they have premonitions of difficulty in collecting accounts. The statute provides that where practitioners have elected to follow the route of direct billing to the patient they must "before rendering an insured service, advise the insured person in writing that (they have) made that election and propose to collect (their) account directly from the insured person."

Section 20 has some strong requirements for the practitioners when an insured person makes his or her first visit to the practitioner. Before giving any health care service or benefit that is prescribed as an insured service, the practitioners must advise the potential patient of any prescribed limits of coverage for that service or benefit and that the insured person is not covered for a service rendered beyond the prescribed limit. Should the potential patient be seeking a service which is not an insured one then he or she must be advised that there is no coverage of the service to be rendered.

Where an insured person makes his or her first visit to a practitioner who does not have a billing number or is rendering a service contrary to a condition attached to his or her billing number, the practitioner must, prior to performing a health care service or benefit, advise the insured person that he or she is not covered for the service or benefit to be rendered. Obviously, the insured person — the potential patient — maintains a "free choice" in the engagement of the practitioner. It is only incidental, of course, that if the selection of a practitioner without a billing number is made, the patient, who has already paid a premium to the plan, then enjoys the dubious privilege of paying again for the exercise of the "right".

The onus is clearly on the practitioner concerning the circumscriptions imposed by the statute and such regulations as may subsequently be enacted thereto. An insured person is *not* liable to a practitioner for services rendered beyond the prescribed limit, services that are not insured, or services performed by a practitioner who does not have a billing number or is contrary to any conditions which may be attached to the practitioner's billing number, "unless the insured person first agrees to pay for the services rendered."

The Bill is less than clear on how one goes about assuring himself or herself of the acquisition of a billing number. The Cabinet has the authority, under the General Provisions Part (Section 53), to make regulations concerning all aspects of the plan. Among these are regulations respecting the granting of billing numbers and including the establishing of conditions and criteria for granting a billing number according to, **but not limited to**

(a) the practitioner to population ratios in a particular geographic area,
(b) the specific practice of a practitioner,
(c) the duration of practice of a practitioner in the Province, or
(d) any other factor that encourages an efficient distribution of practitioners providing insured services in the Province.

In addition, among several other provisions, the regulations will authorize the commission to impose conditions on a particular billing number (that means a practitioner), a class of billing number (that means a class of practitioners), or on all billing numbers (that means all practitioners) before or after the billing number has been granted. The commission, too, is authorized to establish a maximum number of billing numbers that may be granted for rendering insured services or specified kinds of insured services in a particular geographic area and prescribing the geographic area for purpose of granting billing numbers. If the commission finds itself concerned with the

number of dollars it is spending on the plan, the regulations will give it the authority to prescribe formulas which can be applied, "under specified circumstances, for reducing the total amounts payable under the payment schedule to a practitioner or class of practitioner." The regulatory authority which the Bill confers on the Cabinet is virtually total in its scope. It would be likely, however, that consequent upon the implementation of such regulations, the litigiousness of those affected would be participatingly stimulated!

Inspectors may be appointed

Bill 24 provides for inspectors who may be appointed either by the Minister of Health or the Commission or both for the purpose, among other duties, of inspecting, examining or auditing medical and other records maintained in hospitals, health facilities, laboratories and offices of practitioners respecting insured persons who are receiving or have received insured services.

Concerning private insurance, the Bill provides that "unless the Minister (of Health) has first given his approval, no person shall provide, offer or enter into a contract of insurance for the payment of or reimbursement or indemnification for all or part of the cost of services rendered by a practitioner in the Province to any person eligible to be an insured person under the (Medical Services Act) and the regulations, and a contract so providing is void insofar as it insures against costs payable by the plan." Private insurers, therefore, unless the Ministry of Health decides otherwise, would appear to be precluded from permitting potential policy holders from acquiring benefits similar to those within the government plan but which are obtainable from practitioners without billing numbers.

CONCLUSION

The provisions of Bill 24 should precipate enormous disquietude among medical and dental practitioners not only in British Columbia but, in view of precedental implications, among practitioners in other provinces, as well. Provincial boundaries are not so impermeable that they can invariably withstand the incursions of the legislative provisions of other jurisdictions. It is unacceptable that, in a country which prides itself in the rights and freedom of all its citizens, a legislative proposal, unquestionably perceived by its authors as being in the interest of the greater public good, should so trammel upon the rights and freedoms of professions which, within the delegated legislation by which they have exercised accountable self regulation, have given irrefutable evidence of their capacity to act responsibly.

REFERENCE

Bill 24. *Medical Services Act.* Legislative Assembly of British Columbia.

WORLD DENTAL CONGRESS OF THE F D I

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1. Georgetown Symposium on Analgesics: *Arch. Intern. Med.* 141:273-406, 1981. **2.** Meredith, T. J. and Goulding. R.: *Postgrad. Med. J.* 56:459, 1980. **3.** American Pharmaceutical Association: Handbook of Non-prescription Drugs, ed. 6, Washington, D.C., American Pharmaceutical Association, 1979, p. 129. **4.** Black, M.: *Gastroenterology* 78:382, 1980. **5.** Neuberger, J. et al: *J. Roy. Soc. Med.* 73:701, 1980. **6.** Leading Article: *Brit. Med. J.* 2:958, 1980. **7.** Spector, S. L., et al: *J. Allergy Clin. Immunol.* 64:500, 1979. **8.** Prescott, L. F.: *Drugs.* 23:75, 1982. **9.** Rumack, C. M. et al: *Obstet. Gynecol.* (Suppl) 58:52S, 1981. **10.** Collins, E.: *Obstet. Gynecol.* (Suppl) 58:57S, 1981. **11.** Rudolph, A. M.: *Obstet. Gynecol.* (Suppl) 58:63S, 1981. **12.** Perkin, R. M. et al. *J. Pediatr.* 96:721, 1980. **13.** Atwood, S. J.: *Pediatric Clinics of North America.* 27:871, 1980.

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BOARD OF GOVERNORS NOTICE OF MEETING

The Interim Meeting of the Board of Governors of the Canadian Dental Association will be held on April 8-9, 1984, at the Queen Elizabeth Hotel Montreal, Quebec, commencing at 9:00 a.m. on April 8th.

It is brought to your attention that meetings of the Board of Governors are open to all members of the Association.

The Board is composed of twenty-five governors, representing members across Canada on a 1 to 500 ratio. The Canadian Forces Dental Services and student members are represented by one member each.

If you are planning to attend the 1984 Annual CDA/ODQ Convention in Montreal, you may wish to look in on a portion of the proceedings to gain insight into the policy decisions that affect organized dentistry in Canada.

At press time the list was correct. New governors may be appointed by some provinces in the near future.

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Service aux membres de l'ADC

Le régime enregistré d'épargne-retraite: élément fondamental de sécurité du revenu à la retraite.

Kenneth J. Ransby, FSA, FCIA

À titre de service aux membres, l'Association dentaire canadienne offre un régime enregistré d'épargne-retraite réservé exclusivement à ses membres. Ce régime est administré par la société Canadian Dental Service Plans Inc. (CDSPI).

Le présent article est le quatrième d'une série sur l'adhésion à l'Association, dans laquelle nous donons des détails sur les avantages dont bénéficient les dentistes canadiens lorsqu'ils sont membres de l'Association dentaire canadienne.

Quel que soit leur milieu, les canadiens se préoccupent de leur sécurité financière. La plupart d'entre nous rêvent de gagner cette sécurité financière d'une manière fortuite — en gagnant à la loterie, par exemple, ou en transformant une invention simple ou des investissements modestes en profits immenses. Malheureusement, la grande majorité de la population n'arrive à obtenir cette sécurité qu'en travaillant dur et en économisant.

Les membres de professions libérales, comme les dentistes, n'ont en général pas trop de difficultés à gagner suffisamment d'argent pour se payer du superflu, comme des vacances au soleil, ou une voiture neuve, etc.... Avec une bonne planification, un revenu régulier et supérieur à la moyenne, on est en général assuré de pouvoir disposer de cet argent. Mais il est beaucoup plus difficile d'épargner suffisamment pour pouvoir continuer à vivre confortablement quand on a pris sa retraite; les individus doivent s'engager financièrement à long terme pour assurer ce genre de sécurité.

Pour illustrer l'importance de l'investissement nécessaire pour obtenir la sécurité du revenu à la retraite, considérer un dentiste, âgé de 40 ans, qui gagne actuellement un revenu net de $50,000 après paiement de ses frais d'exploitation mais avant paiement de l'impôt sur le revenu. Si ce dentiste a un revenu qui augmente de 7% par an, et s'il doit prendre sa retraite à 65 ans, il lui faut approximativement $1,000,000 à l'âge de 40 ans pour jouir d'un revenu qui lui permette un mode de vie raisonnable à la retraite.

En vérité, $1,000,000 est une somme énorme, surtout quand on tient compte des avantages sociaux octroyés par le gouvernement (Régime de pensions du Canada et Pension de vieillesse), dont bénéficie le dentiste retraité. Également, on doit supposer un montant en dollars de ces avantages sociaux à la retraite beaucoup plus élevé qu'en 1984 (à l'heure actuelle les paiements en vertu des deux régimes combinés sont d'environ $7,800 par an).

À l'heure actuelle, le but des programmes gouvernementaux n'est pas de donner aux retraités un revenu supérieur à celui de subsistance. En outre, en dépit de nombreuses études sur les régimes de retraite, entreprises par le gouvernement fédéral et les gouvernements provinciaux, le secteur privé et les syndicats, il semble tout à fait improbable que le gouvernement augmente les prestations dans l'avenir, de manière à donner aux retraités canadiens un revenu plus que modeste. Il est clair que, pour ceux qui ont un revenu supérieur à la moyenne, la responsabilité de combler l'écart entre ce niveau de revenu modeste et la sécurité financière totale incombe aux employeurs avec leurs régimes de retraite privés et aux individus eux-mêmes, avec leur épargne personnelle.

Naturellement, les dentistes et les autres personnes qui travaillent à leur propre compte n'ont pas accès aux régimes de retraite offerts par des employeurs. Ils ont néanmoins la possibilité de faire des contributions importantes, qui sont déductibles d'impôt, à des régimes enregistrés d'épargne-retraite, dans le but d'accumuler les fonds nécessaires à leur sécurité financière pendant leurs années de retraite.

En vertu de la Loi canadienne actuelle de l'impôt sur le revenu, un individu qui n'est pas membre d'un régime enregistré de retraite a le droit de faire des contributions déductibles d'impôt à un REER, d'un montant maximum de $5,500 (ou 20% du revenu qu'il a gagné, si ce pourcentage est inférieur), par année d'imposition. Il faut espérer que ce plafond déductible d'impôt augmentera avec le temps — et le plus tôt sera le mieux (la dernière fois que ce plafond déductible d'impôt a augmenté, c'était en 1976, et il était alors de $4,000). Autrement, le gouvernement risque de limiter considérablement dans le futur les possibilités de revenu de retraite adéquat.

Vous avez également le droit de faire des contributions déductibles d'impôt à un REER enregistré au nom de votre épouse. Cela peut être intéressant quand on encaisse les fonds à la retraite, car l'impôt, alors déduit des prestations du REER, est cauculé sur la base du taux d'imposition qui s'applique à l'épouse, qui est souvent moins grand que le taux s'applicant au dentiste retraité. Il faut cependant souligner que ces contributions, faites au nom de l'épouse, n'augmentent pas le plafond des contributions déductibles d'impôt.

La plupart des dentistes ont déjà compris l'intérêt de faire des contributions à des régimes enregistré d'épargne-retraite. Des statistiques publiées par Revenu Canada montrent que, pour l'année d'imposition 1980, la contribution moyenne aux REER des dentistes travaillant à leur propre compte était d'environ $3,700. Le tableau suivant devrait permettre aux

personnes ayant décidé de retarder leurs contributions à un REER à une date ultérieure, de mieux comprendre pourquoi il faut commencer tôt à contribuer:

Vous êtes priés de noter que dans le total accumulé à 65 ans, la portion représentée par le "rendement de l'investissement" augmente considérablement pour les personnes qui commencent à contribuer quand elles sont jeunes. Par exemple, si l'on considère les chiffres figurant sous la colonne "rendement de l'investissement: 8% par an", le rendement total de l'investissement accumulé par celui qui commence à cotiser à 50 ans est moins grand que le capital investi, alors que le rendement accumulé par celui qui commence à cotiser 30 ans est égal à environ 4 fois le montant de l'investissement.

Accumulation de contributions annuelles de $1,000 à un REER

À 65 ans à partir de:	Rendement de l'investissement 6% par an	8% par an	10% par an
50 ans			
— Contributions à un REER	$ 15,000	$ 15,000	$ 15,000
— Rendement de l'investissement	8,276	12,152	16,772
—Total accumulé	**23,276**	**27,152**	**31,772**
40 ans			
— Contributions à un REER	$ 25,000	$ 25,000	$ 25,000
— Rendement de l'investissement	29,865	48,106	73,347
—Total accumulé	**54,865**	**73,106**	**98,347**
30 ans			
— Contributions à un REER	$ 35,000	$ 35,000	$ 35,000
— Rendement de l'investissement	76,435	137,317	236,024
—Total accumulé	**111,435**	**172,317**	**271,024**

Ces exemples démontrent également qu'une augmentation du rendement annuel de l'investissement pendant la période d'accumulation a une influence mejeure sur le montant total des fonds accumulés. Cela signifie que vous devez investir vos contributions à un REER de la manière la plus efficace, soit:

— en choisissant, selon vos préférences personnelles, dans votre REER, les investissements qui produisent le rendement le plus élevé, tout en garantissant un niveau approprié de risque, et
— en choisissant pour investir un REER qui occasionne des dépenses relativement basses de gestion, de commissions et d'autres frais d'administration.

Un grand nombre d'organismes, comme les banques, les sociétés de fiducie, les compagnies d'assurance et les caisses de crédit, offrent des REER. L'Association dentaire canadienne, à titre de service aux membres, a également créé un Régime enregistré d'épargne-retraite, auquel environ 1,200 dentistes (y compris un certian nombre d'épouses) contribuent. Le Régime de l'ADC est administré par la société Canadian Dental Service Plans Inc. (CDSPI).

Brian Henderson, directeur de l'Agrément

L'Association dentaire canadienne a un nouveau directeur de l'Agrément en la personne de M. Brian J. Henderson (B.A., M.Ed.). Celui-ci occupe son nouveau poste depuis le 1er décembre dernier, succédant au Dr Victor Chatwin qui a quitté l'ADC à la fin de l'année après cinq années de service.

Diplômé de l'Université Queens et de l'Université d'Ottawa, M. Henderson possède une grande expérience dans le domaine de l'agrément des programmes d'éducation, puisqu'il a travaillé, pour le compte de l'Association médicale canadienne, comme coordinateur de l'Agrément et des programmes d'éducation en sciences médicales connexes. Il était aussi chargé de plusieurs comités mixtes nationaux liés à l'agrément et gérant les programmes de diverses disciplines médicales, y compris la technologie de laboratoire et la technologie ultrasonique.

Avant de se joindre à l'AMC, M. Henderson a travaillé au Collège Algonquin, à Ottawa, où il a été tour à tour directeur de la Faculté d'anglais, directeur des sciences sociales, président du Département des sciences et des arts généraux, et doyen de la Division des sciences de la santé.

En outre, M. Henderson est présentement membre du Conseil d'administration de l'Hôpital Général d'Ottawa.

Directives touchant la réduction du taux des radiations dans les cabinets dentaires

À l'assemblée du Conseil d'administration de l'ADC qui s'est tenue à Vancouver, en septembre 1983, on a adopté les directives suivantes touchant la réduction du taux des radiations dans les cabinets dentaires.

Avant-propos

Étant donné que, d'une part, le gouvernement fédéral a juridiction sur les normes de fabrication et d'opération des appareils radiographiques et que, d'autre part, les lois provinciales gouvernent leur installation, leur enregistrement et les critères touchant l'aménagement des cabinets en vue de leur utilisation, toute directive formulée par l'ADC touchant l'utilisation des appareils radiographiques dans les cabinets dentaires ne doit pas avoir trait spécifiquement aux aspects légaux, mais plutôt aux normes d'exercice pour les dentistes, lesquelles doivent traduire et exiger une compétence et un jugement professionels.

Directives générales

1. Tout appareil de radiographie doit être conforme aux exigences de la Loi fédérale sur les dispositifs émettant des radiations.
2. Toute installation d'appareil de radiographie et tout critère touchant l'aménagement des pièces où semblable appareil sera installé devront être conformes aux règlements provinciaux, notamment pour l'isolement des murs (revêtement de plomb ou l'équivalent). À défaut d'un règlement provincial, tout dentiste doit se référer au Code de sécurité 22 de Santé et Bien-être social Canada, au Rapport 35 du *National Council on Radiation Protection and Measurements* (États-Unis) ou aux recommandations que l'Association dentaire américaine a formulées en 1981 touchant les usages en radiographie.
3. Tout radiologiste doit posséder des conaissances suffisantes touchant la physique radioactive et les dangers radioactifs, et être capable de produire régulièrement des radiographies de bonne qualité pour les diagnostics, et ce avec une exposition minimale aux radiations.
4. Il est hautement souhaitable qu'on établisse un programme pour inspecter régulièrement les appareils de radiographie (habituellement tous les trois ans). Il est recommandé d'établir un programme qui, par la révision des conditions de développement, assure des radiographies de bonne qualité.
5. Il est hautement souhaitable que le radiologiste ou le propriétaire demande à un technicien compétent d'inspecter régulièrement ses appareils de radiographie afin d'évaluer la puissance des radiations et de "régulariser" le mécanisme de prise de radiographie. Autrement dit, le technicien doit s'assurer que la prise des radiographies et les conditions de développement n'entraînent pas une exposition aux radiations qui dépasse la marge jugée acceptable
6. Près du minuteur, on doit fixer un tableau de directives indiquant le kilovoltage (kC) et le milliampérage (mA) ainsi que le temps d'exposition pour les enfants, les adultes et les édentés.
7. On doit regarder les radiographies développées dans des conditions optimales. Il est souhaitable d'utiliser un négatoscope avec une source de lumière à intensité variable. Toute autre lumière doit être réduite le plus possible.
8. Il est hautement souhaitable que les dentistes suivent des cours d'éducation permanente en radiodiagnostic, en technologie diagnostique et en radioprotection.

Protection des radiologistes

1. Tout radiologiste doit détenir un diplôme ou être agréé conformément aux normes reconnues par l'ordre professionnel dentaire de sa province.
2. Toute radiologiste qui croit être enceinte ou sait qu'elle l'est doit s'assurer que, durant la grossesse, elle sera exposée le moins possible aux radiations. Il faut bien noter qu'un foetus est particulièrement sensible aux dommages causés par les radiographies.

Radiologistes en cours de formation

1. Le personnel en cours de formation doit travailler sous la surveillance d'un dentiste diplômé.
2. En principe, les radiologistes en cours de formation ne doivent pas avoir moins de 16 ans. Pour tout étudiant qui n'a pas atteint cet âge, la dose annuelle des radiations ne doit pas excéder 500 millirems, surtout pour les gonades et la moelle des os.
3. Le personnel ne doit pas être exposé au premier rayon. Toute exposition intentionnelle à des fins de formation ne doit être effectuée par qui que ce soit.

Directives générales pour le personnel de bureau

1. Une pièce ne doit pas être utilisée pour plus d'une radiographie à la fois.
2. Sauf en cas d'absolue nécessité, personne ne doit se trouver dans une pièce où il y a exposition.
3. Si le radiologiste doit demeurer dans la pièce avec le patient durant l'exposition, il doit porter des vêtements protecteurs.
4. Le film dentaire doit être fixé au moyen d'un dispositif de fixation s'il y a lieu.
5. Si un parent du patient ou une personne accompagnant celui-ci doit assister le radiologiste, il ou

elle doit porter des vêtements protecteurs.

6. L'appareil de radiographie ne doit pas être tenu à la main durant son opération.
7. Chacun des membres du personnel de bureau travaillant avec des appareils de radiographie doit posséder un dosimètre.
8. Si le radiologiste se trouve dans la pièce avec le patient durant l'exposition, le dosimètre doit se porter sous le tablier protecteur avec revêtement de plomb.
9. Si des personnes reçoivent des doses excessives de radiations (plus de 25 pour cent de la dose maximale permise), on doit corriger la situation et prendre les mesures qui s'imposent touchant les techniques et la protection.

Directives pour protéger le patient

Une seule radiographie dentaire comporte très peu de dangers pour un patient. Toutefois, le danger pour le public s'accroît suivant la fréquence des examens avec radiographie et le nombre des personnes radiographiées. Il importe donc de tenter de réduire le plus possible le taux des radiations requis pour poser un diagnostic.

1. Pour prescrire une radiographie, un dentiste diplômé doit se fonder sur un examen clinique et vouloir obtenir des renseignements qui ne sont pas disponibles autrement.
2. Une radiographie dentaire doit se justifier par un besoin défini en vue d'obtenir un renseignement précis qui servira au diagnostic ou à la prévention, et non faire partie d'un examen périodique, que le dentiste ait examiné le patient ou non au préalable.
3. On doit déterminer si des radiographies dentaires du patient sont déjà disponibles et, le cas échéant, déterminer si elles sont satisfaisantes.
4. Lorsqu'un patient passe d'un dentiste à un autre et que des renseignements sont exigés à des fins de diagostic, lesquels peuvent être obtenus avec des radiographies prises antérieurement, le nouveau dentiste doit tenter d'obtenir ces radiographies plutôt que de prescrire automatiquement de nouvelles radiographies.
5. Le nombre de radiographies requises doit être le moins élevé possible et correspondre aux renseignements recherchés.
6. Le radiologiste doit choisir une pellicule dont la durée d'exposition et la qualité permettront la production de radiogrammes de qualité acceptable pour les diagnostics tout en offrant une exposition minimale aux radiations pour le patient.
7. La qualité des radiographies doit être vérifiée régulièrement pour assurer qu'elles répondent aux exigences du diagnostics.
8. Si les radiographies ne sont pas de la meilleure qualité mais suffisent pour le diagnostic, on ne doit pas en prendre d'autres.
9. On doit utiliser un tablier et un cache-col (pour protéger la thyroïde) avec revêtement de plomb pour les radiographies intrabuccales.
10. Le faisceau radiographique doit être bien collimaté de manière à irradier seulement la plus petite partie possible nécessaire à l'examen. Au niveau de la peau, il ne doit en aucun cas excéder 7 cm (2 3/4 pouces).

Les patientes enceintes

1. Les procédures facultatives doivent être reportées après la grossesse.
2. Si des radiographies s'imposent, on doit prendre toutes les précautions possible tout en respectant les techniques agréées.

Conclusion

Si toutes ces directives sont suivies, le patient sera assuré que le taux des radiations auquel il sera exposé sera le plus sûr possible pour sa santé. La fréquence des radiographies est affaire de jugement. Et le choix de l'équipement et des techniques est à la discrétion du dentiste. Toutefois, le but ultime est de réduire le taux des radiations émanant des cabinets dentaires. Dans ce dessein on a formulé et adopté le principe voulant qu'une exposition aux radiations qui peut être réduite sans perte de renseignements importants pour le diagnostic et sans trop de frais ou d'incommodité, le soit, si peu que ce puisse être, et qu'une exposition aux radiations qui peut être totalement évitée sans conséquences graves, le soit. Il faut en tout temps appliquer le principe de la plus faible exposition possible.

Régime d'épargne-retraite de l'ADC

Les valeurs respectives du Régime d'épargne-retraite de l'Association Dentaire Canadienne étaient les suivantes au 30 novembre 1983.

Fonds d'actions ordinaires	$78.01933
Fonds à revenu fixe	$37.71952
Fonds garanti	$27.29416
Fonds de placement	$15.45642

L'avoir total (valeur marchande) du régime s'élevait à $38,443,579.

Au 31 octobre 1983, les chiffres du mois précédent étaient les suivants:

Fonds d'actions ordinaires	$71.44569
Fonds à revenu fixe	$37.39415
Fonds garanti	$27.08490
équilibré	$15.19816

L'avoir total (valeur marchande) du régime s'élevait à $37,227,863.

Pour de plus amples renseignements, veuillez écrire à l'adresse suivante: Canadian Dental Service Plans Inc., Ste. 600, 2 Lansing Square, Willowdale, Ontario M2J 4Z3, ou appeler le service de renseignements du CDSPI en composant 1-800-268-5418 (appel sans frais pour l'Ouest canadien, les Maritimes et l'Ontario où le code est 807 seulement), 1-800-268-3411, (appel sans frais pour le Québec et l'Ontario sauf où le code est 807), et 497-7117 (Région métropolitain de Toronto).

Il se produit toujours des tentatives d'usage illicite des médicaments

Le personnel du Journal pense que l'article suivant, écrit pour le Bulletin dentaire de Colombie Britannique par Linda J. Brown, BSc(Phr), Coordinatrice des communications du Collège des pharmaciens de Colombie Britannique, devrait beaucoup intéresser les dentistes praticiens de tout le Canada. Nous le ré-imprimons avec la permission de l'auteur.

On détourne énormément de produits pharmaceutiques des canaux légitimes de distribution au marché noir. Les stupéfiants analgésiques sont toujours les médicaments le plus souvent utilisés pour des usages non médicaux. Il semble qu'un grand nombre d'utilisateurs illicites de drogues soient tentés par la bonne qualité, la facilité relative avec laquelle on peut légitimement obtenir des produits pharmaceutiques, et leur prix plus bas (par rapport à l'héroïne ou à la cocaïne par exemple).

Le prix actuel au marché noir de certains médicaments donne une idée des profits qui peuvent réaliser les personnes qui réussissent à obtenir par ordonnance un médicament qu'on peut utiliser à fins non médicales.

Médicament	Prix au marché noir (par comprimé-capsule)
Talwin Composé 50	$ 5—$10
Fiorinal C1 2	$ 1—$ 5
Percocet Percodan	$ 3—$ 5
Dilaudid	$50—$80
Demerol	$ 5—$10

Les dentistes sont vulnérables

Les dentistes praticiens sont vulnérables pour de nombreuses raisons:

Cambriolages de cabinets dentaires et, plus rarement, vols à main armée. Les criminels sont souvent à la recherche d'argent, de médicaments et de formulaires d'ordonnances.

Vols de formulaires d'ordonnances. Le voleur peut remplir ces formulaires lui-même, ou les vendre au marché noir, où ils peuvent lui rapporter jusqu'à $10 le formulaire.

Symptomes simulés ou cultivés. Les drogués évitent souvent de se faire traiter pour des problèmes comme des abcès et des caries afin de pouvoir présenter des symptômes justifiant l'ordonnance de stupéfiants.

Visites médicales multiples. Certains drogués coordonnent soigneusement leurs visites aux dentistes, aux médecins et aux pharmaciens afin d'éviter de provoquer des soupçons. À maintes occasions, on a pu arrêter des drogés grâce à un système de fichier qui permet de retrouver le nom des médecins des dentistes, et des pharmaciens, ainsi que les numéros d'ordonnances et leurs dates.

Les «visites médicales doubles» et les «visites médicales multiples» sont des actes interdits en vertu du règlement 3(3) de la Loi canadienne sur les stupéfiants, qui dit: «(3) Il est interdit à toute personne qui a obtenu un stupéfiant ou une ordonnance de chercher à obtenir ou de recevoir une autre ordonnance ou un autre stupéfiant de tout autre médecin praticien sans donner à ce dernier les détails de chaque ordonnance ou stupéfiant qu'elle a obtenus dans les 30 jours précédents.» Le Bureau des drogues dangereuses est prêt à enquêter lorsqu'une personne ne se conforme pas à ce règlement.

Les falsifications d'ordonnances. Lorsqu'une ordonnance est mal écrite, c'est une invitation à la falsification. Par exemple, on peut facilement transformer un «10» en «40», «70», ou «100».

Vous pouvez prendre les précautions suivantes

1. Évitez que l'on falsifie les ordonnances que vous avez écrites. Écrivez les quantités. Signez l'ordonnance immédiatement après le dernier médicament prescrit, et tracez une ligne sur tous les espaces libres.

2. Prenez des mesures de sécurité strictes pour ranger vos formulaires d'ordonnances.

3. Évitez de tamponner ou de préimprimer vos ordonnances. Écrivez vous-mêmes vos ordonnances, d'une manière lisible.

4. Ne signez jamais d'avance des formulaires d'ordonnances.

5. Ne demandez jamais à votre personnel de remplir des ordonnances pour vous; ne dictez jamais d'ordonnances à votre personnel.

6. Conservez un stock réduit de médicaments, et mettez le en sureté.

7. Méfiez-vous quand un patient demande un médicament spécifique.

8. Lorsqu'un patient agit d'une manière anormale, ou vous est inconnu, ne prescrivez pas des stupéfiants.

9. Développez des communications avec les pharmaciens locaux. Ils sont peut-être au courant de certaines activités de patients qui vous aideront à juger ses demandes de médicaments.

L'aide supplémentaire disponible

Le Collège des pharmaciens de Colombie Britannique opère un système d'alerte téléphonique pour avertir les pharmaciens de falsifications d'ordonnances, de vols de formulaires, et d'autres activités relatives aux médicaments survenues dans leur secteur. Après avoir vérifié les rapports de médecins, de dentistes ou de pharmaciens, le coordinateur du système envoie un avertissement aux personnes concernées dans la Province.

Le Collège tient également une filière des noms utilisés par les personnes qui ont été impliquées dans des incidents de détournement de médicaments. Nous prions les praticiens de demander les noms contenus dans cette filière. Contactez le Coordinateur des communications, Collège des pharmaciens de Colombie Britannique, 683-6588.

Note du rédacteur: la Colombie Britanique est actuellement la seule province du Canada à avoir un système d'alerte téléphonique pour prévenir l'usage illégal de drogues.

Efforts conjoints de l'ADC, de l'ACDI et du Nouveau-Brunswick pour établir un programme dentaire dans les Antilles.

L'ADC a reçu de l'Agence canadienne de développement international (ACDI) une subvention pour lancer un programme dentaire éducatif et préventif à l'intention des enfants d'école primaire habitant les îles St-Kitts et Nevis.

Le programme est subventionné en grande partie par l'Agence canadienne de développement international (ACDI) qui a remis à l'Association dentaire canadienne la somme de 24 000$ pour le mettre en oeuvre. Grâce à ce programme, les enfants d'école primaire seront initiés aux règles de l'hygiène dentaire et recevront un rince-bouche fluoruré.

Après avoir obtenu la subvention de l'ACDI, l'ADC a demandé au ministère de la Santé du Nouveau-Brunswick de l'aider à lancer le programme. En effet, la province en applique un semblable dont les avantages à long terme commencent à se faire voir et qui suscite l'intérêt à travers tout le pays. Étant donné ce grand succès, l'ACDI et l'ADC ont voulu tirer profit de l'expérience du Nouveau-Brunswick et se sont adressées au Dr John Blackmer directeur du service de santé dentaire pour le ministre de la santé du Nouveau-Brunswick à titre d'expert-conseil.

En avril 1983, le Dr Blackmer a visité les îles St-Kitts et Nevis pour y rencontrer le ministre de la Santé et le représentant dentaire du gouvernement. On a alors convenu d'un plan et, à l'automne, on est passé à l'action. Le programme a été placé sous la surveillance de l'hygiéniste dentaire du ministère de la Santé du Nouveau-Brunswick et de la présidente de l'Association canadienne des hygiénistes dentaires.

Selon le Dr Blackmer, le ministre de la Santé des îles St-Kitts et Nevis, M. Sidney Morris, veut que le programme insiste sur les mesures de prévention. "Son objectif est la prévention d'abord, plutôt que le traitement ensuite; c'est exactement l'objectif du programme rince-bouche du Nouveau-Brunswick," a conclu le Dr Blackmer.

Le BNEDC gagne son procès en Cour fédéral d'appel

En 1983, une candidate qui avait échoué intentait un procès au Bureau national d'examen dentaire du Canada, en Cour fédérale d'appel.

C'était la première fois que cela se produisait en 31 ans d'existence.

La candidate attaquait les règles fondamentales suivantes du Bureau:

1. Le droit du Bureau de déterminer les exigences de certification et d'utiliser à la fois le processus d'examen et celui d'agrément pour accorder la certification.
2. Le mécanisme d'appel du Bureau. La candidate avait demandé une audition en présence de son examinateur. Le tribunal jugea que le processus d'appel du Bureau, qui consiste en une soumission par écrit, était adéquat, en particulier dans la mesure où la candidate pouvait se représenter à l'examen en question.
3. Divulgation: D'après la candidate, le Bureau avait violé un principe de justice naturelle en ne divulgant pas suffisamment de détails et en ne donnant pas les raisons de l'échec. Le Dr Gundega Kravis, Secrétaire du BNECD, répondit que les raisons de l'échec étaient toujours données au candidat qui les demandait.
4. Crédibilité des examinateurs du Bureau. Le tribunal considéra que cette question était matière à expertise.
5. Charte canadienne des droits et libertés: Finalement, le candidat attaqua le BNECD en vertu du paragraphe (6)(2) de la Charte canadiene des droits et libertés qui dit: «Tout citoyen canadien ou toute personne ayant le statut de résident permanent au Canada ont le droit . . . de gagner leur vie dans toute province.» L'avocat du Bureau réfuta cet argument en se basant sur la jurisprudence, en particulier sur un jugement de Colombie Britannique qui dit qu'une personne n'a le droit d'éxercer la profession qu'elle a choisie que lorsqu'elle s'est qualifiée et qu'elle est inscrite auprès de l'organisme ayant le pouvoir d'octroyer une licence.

Le tribunal rendit son jugement en faveur du Bureau national d'examen dentaire du Canada.

PAGE COUVERTURE

La page couverture du présent numéro fait voir Montréal, l'un des plus grands centres urbains du Canada et le site du Congrès mixte de l'ADC et de l'ODQ, "les journées dentaire 1984", du 8 au 12 avril.

De plus, le congrès aura lieu dans le tout nouveau Palais du congrès. Cependant, certains programmes auront pour cadre l'élégant hôtel Reine Elizabeth.

Le Journal de l'ADC remercie la Commission d'initiative et de développement économiques de Montréal pour lui avoir communiqué cette photo.

L'habit fait-il le moine?

par Jean Cives

Que doivent porter un dentiste et ses associés? Cette année, la mode italienne propose, pour les mannequins tout au moins, la peau ou la fourrure rasée de belette. À Paris, les collections d'automne évoquent l'Arabie avec ses burnous et ses robes flottantes. Ce style ne conviendrait guère pour se prélaser dans les auto-services de Winnipeg, attendant l'arrivée du Père Noël, mais pourrait créer un effet dans les bureaux de réception, à Terre-Neuve, où les réserves d'huile atteignent enfin le continent.

Pour le dentiste canadien moyen cependant, que sera la mode? Dans le passé, on a vu les styles les plus hétéroclites. Ainsi, mon premier dentiste était un vétéran de la Première Guerre qui se désolait sans doute qu'elle eût pris fin, puisqu'il portait une veste blanche de l'école militaire et arborait une moustache taillée avec une rigueur toute disciplinaire. De plus, il s'était entouré de vieilles photos brunies montrant ses anciens collègues (ceux-ci portaient des bandes molletières enroulées au bas des jambes pour empêcher la boue de pénétrer dans leurs chaussures et de leur causer des engelures aux pieds) debout devant des tentes en France, en Mésopotamie ou dans d'autres endroits invraisemblables pour le dentiste d'aujourd'hui. Ce décor indiquait comment devait s'exercer la médecine dentaire. Les caries étaient dépistées avec le même zèle que celui qu'avait déployé le baron von Richtofen pour repérer Billy Bishop. La sonde fouillait les dents et les réactions du patient étaient attentivement étudiées: suivant les règles de l'armée, un petit cri indiquait une obturation et un profond gémissement une extraction. Et s'il s'agissait d'une personne jeune ou d'une femme, le dentiste, à l'aide d'une seringue, extrayait d'une bouteille, sous les yeux médusés du patient, une dose d'analgésique. Tout cela se faisait dans une atmosphère amicale. L'aiguille était changée chaque mois, que ce fût ou non nécessaire. Et occasionnellement, tout l'appareil était mis dans l'eau bouillante avec les autres instruments pouvant causer des infections. Seuls les microbes les plus entêtés survivaient et seuls les patients les plus entêtés retournaient chez le dentiste...

Voici un article qui fait voir que la dentisterie n'est pas totalement dépourvue d'élégance. Il a été écrit par un ancien collaborateur du Journal, Jean Cives. À l'avenir, la rédaction se propose de publier périodiquement des articles du même genre.

Dans les années 1960, la dentisterie se voulut aseptique et se vêtit de blanc de la tête aux pieds. (Pour ma part, je conserve toujours une paire de souliers blancs à demi usés au cas où j'aurais envie de jouer au cricket.) Toutefois, ce costume sentait trop la clinique et l'hôpital. Aussi quelle réaction vit-on à la fin des années 1960 et au début des années 1970! Parmi les dentistes, ce n'étaient plus que colliers, chaînes en or, chemises à col ouvert et, partout, des moquettes. La femme dentiste, il est vrai, portait toujours une robe ordinaire achetée à la Baie ou dans quelque boutique, mais sa coiffure! On se souvient sans doute des fameux nids d'abeille; coiffée ainsi, une dentiste semblait être hydrocéphale.

Maintenant, nous avons atteint les années 1980 et les temps sont difficiles. Il reste encore quelques hippies, certes, mais ils portent moins de bijoux. Ils continuent quand même à jouer les bohémiens, même si c'est seulement sur les pentes de ski ou à bord de leur yacht. Hélas, il leur pousse à peine assez de cheveux pour chacher leur chevelure postiche. Qui donc croient-ils abuser?

Dans le domaine de la mode, le principal tour de force que je désire signaler, c'est la veste parue l'an dernier, quelque peu déchirée, la fermeture éclair réparée à la brocheuse, le tout décoré de restes de décalques à base de caoutchouc. Vient ensuite la vieille veste de l'étudiant dentaire. Je connais un dentiste qui, sauf pour un court intermède en 1973-1974 alors qu'il affectionnait une ou deux chemises à carreaux, porte sa veste d'étudiant depuis 1968.

Qu'en est-il des autres catégories, comme aurait dit mon ancien dentiste? Les pantalons sont maintenant à la mode. Et les postérieurs aussi. Je me souviens d'un poème ainsi tourné:

En la voyant venir,
On dit: quelle déesse!
En la voyant partir:
Mais elle est toute en fesse!

Cruel, bien sûr. Cependant, l'uniforme qui est apparu au temps de Pasteur et qui montrait les infirmières avec des taches disgracieuses et désagréables, on le porte aujourd'hui chez soi pour partager avec le reste de la famille les éclaboussures de la dentisterie.

Que réserve l'avenir? Certainement pas de la belette rasée, ni des bracelets, des torses velus ou des colliers. Pour être audacieux il faudra, à mon avis, faire fi de notre réputation de professionnels de la santé. Fini les habits pour le jogging ou pour les exercices aérobiques. Je nous vois comme des artistes faisant de belles couronnes, effectuant de nouveaux traitements pour poser ces couronnes près de belles gencives roses. Nous voudrons porter la blouse, des sandales, des pantalons en velours côtelé, des bérets et des chapeaux mous. Vous aimez? À vrai dire, nous pourrons difficilement paraître plus drôles que jamais nous l'avons été dans le passé.

Les Journées Dentaires 1984

Congrès conjoint de l'ADC et de l'ODQ Avril à Montréal — du 8 au 12 avril 1984

Deux grands congrès dentaires ont marqué l'année 1983: Les Journées dentaires du Québec, à Montréal au mois de mai et, en septembre, le congrès de l'Association Dentaire Canadienne à Vancouver. Voilà bien deux réussites sans contredit!

Avril 1984: un nouvel événement sans égal se prépare: Les Journées dentaires 1984. En effet, l'Association dentaire canadiennne et l'Ordre des dentistes du Québec joignent leurs efforts pour vous offrir un programme fort prometteur, des conférences traitant de sujets à la fine pointe du progrès. Un programme au caractère unique, tout-à-fait bilingue, aussi complet en français qu'il peut l'être en anglais. Se joignent à nous pour rendre cette rencontre mémorable plusieurs organisations et associations nationales.

Votre divertissement n'est pas négligé: chaque soirée vous réserve ses surprises: table de gourmet, spectacles, chants et danses continuelles.

C'est Avril à Montréal . . . l'occasion rêvée de découvrir une ville unique en Amérique du Nord. Montréal, véritable trait d'union entre les traditions de l'Ancien et le dynamisme du Nouveau. Vous y retrouverez les traditions européennes, savamment réunies au savoir-faire du Nouveau Monde.

Le Président de l'Association dentaire canadienne, le Président de l'Ordre des dentistes du Québec, le Comité d'organisation vous invitent à participer à ce grand congrès, à Montréal. Tous y seront pour vous accueillir.

Michel Jahjah, d.d.s.
Président du Conseil de gestion

Les Journées Dentaires 1984
Pre-Convention/Limited Attendance Courses
Pré-congrès/Séances réservées
Queen Elizabeth Hotel/Hôtel Reine Elizabeth

English Program/Programme en anglais

Sunday, April 8 9h00 — 12h00 14h00 — 17h00

DR. FRANCIS G. EDWARDS
THE MARKETING OF PROFESSIONAL SERVICES

Dentists have long regarded the direct marketing of their services as undignified and unprofessional. Today, there are serious reasons to reconsider this position. The health of the oral cavity is getting better with every passing decade. Improved hygiene, better nutrition, fluorides and education have all decreased demand, while increasing numbers of new graduates look for practice locations in already over-serviced communities. Some believe that advertising will help. So far there is little evidence to support this belief.

More far-sighted professionals, realizing that advertising is just a part of marketing have now begun to ask, "What is marketing?, How do I learn more about it?, How will it affect my practice?, Will I suffer if others do it and I don't? Fortunately, over the years, a body of reliable knowledge on the subject of marketing has slowly been developed. With appropriate refinements, much of it is directly applicable to professional services.

Topics covered will include: The evolution of modern marketing; How purchasing decisions are made; Does the dentist need to advertise?; The importance of non-verbal communications; How to improve personal contacts; How to do some basic marketing research.

Monday, April 9 9h00 — 12h00 14h00 — 17h00

DR. ALVIN J. FILLASTRE
PREDICTABLE RESTORATIVE PROCEDURES

A large measure of the stress which many dentists experience today in dental practice is due to lack of predictability of treatment results. With the objective of increasing predictability of finished cases, Dr. Fillastre will present his concepts and techniques proven to lead to this end. A partial list of subjects includes tooth preparation design, impression, pontic design, provisional restorations, and cementation. Special emphasis will be given to methods of communication to the dental laboratory technician on exactly what is desired with regard to both occlusion and esthetics.

Dr. Fillastre has presented many programs throughout the U.S. as well as several foreign countries. He believes that the practice of dentistry should be a gratifying and pleasurable experience. His lectures reflect this philosophy and will show you how to approach a similar attitude.

French Program/Programme en français

Dimanche 8 avril 9h00 — 12h00 14h00 — 17h00

DOCTEURS PIERRE DUQUETTE
& ROBERT LANGLAIS (Programme '83 en reprise)
CONFÉRENCE CLINICO-PATHOLOGIQUE

Présentation de cas cliniques où chacun des participants pourra y aller de ses recommandations et expliquer les raisons qui l'incitent à poser un diagnostic spécifique.

Lundi 9 avril 9h00 — 12h00 14h00 — 17h00

DOCTEURS ALAIN VAILLANCOURT, JACQUES VALIQUETTE, CLAUDE LAMARCHE, NORMAND TARDIF, HUAN PHAM ET ALDO CAMARDA
JOURNÉE D'ÉTUDE EN PROTHÈSE COMPLÈTE

- Esthétique
- Prothèse hybride
- Mise en condition de la muqueuse
- Matériaux utilisés
- Chirurgie préprothétique
- Greffe de peau et abaissement du plancher
- Augmentation du volume de la crête par greffes osseuses ou autres matériaux
- Implant

Les Journées Dentaires 1984

Congrès conjoint de l'Ordre des dentistes du Québec et de l'Association dentaire canadienne

Programme Préliminaire

PRÉ-CONGRÈS — SÉANCES RÉSERVÉES — RÉSERVATIONS REQUISES — HÔTEL REINE ELIZABETH

DATE/LANGAGE	ORATEUR/SUJET
Dimanche 8 avril 1984	
Français:	Dr Pierre Duquette, Montréal Dr Robert Langlais, Texas *Conférence Clinico-Pathologique — Programme '83 en reprise*
Anglais:	Dr Francis G. Edwards, Californie *The Marketing of Professional Services*
Lundi 9 avril 1984	
Français:	Dr Alain Vaillancourt & Collaborateurs, Montréal — Dr Aldo Camarda — Dr Huan Pham — Dr Claude Lamarche — Dr Normand Tardif — Dr Jacques Valiquette *Journée d'Étude en Prothèse Complète*
Anglais:	Dr Alvin J. Fillastre, Floride *Predictable Restorative Procedures*

CONGRÈS — Palais des Congrès PROGRAMME SCIENTIFIQUE

Mardi 10 avril 1984	
Français:	Dr Haig Baltadjian — Dr Guimond Hébert — Dr Louis Philippe Lemay — Dr Léon Lemian — Dr Jean Tugeon, Montréal *Pot-Pourri Clinique* Dr Robert Lawlor, Montréal *L'Hépatite B* Dr Normand Brien, Montréal *Prothèse Partielle Amovible* Dr Richard Taché, Montréal *Prothèse Complète* Dr Peter Vaktor, Montréal *R.C.P.*
Anglais:	Dr Gérald Kramer, Boston *Images of comprehensive dentistry* Dr Zia Shey, New Jersey *Pedodontics for the general practitioner* Mr. Bo Braze, Alabama *Modern Ceramic, Techniques in dentistry* Dr Thomas M. Graber, Illinois *The George Wellington Grieve Memorial Lecture*

DATE/LANGAGE	ORATEUR/SUJET
Mercredi 11 avril 1984	
Français:	Dr Jean-Marie Korbendau, France *Périodontie* Dr Victor Legault, Montréal *Pédodontie* Dr Murray H. Diner *Pédodontie* Dr William Donohue & Dr Ronald Fisher, Montréal *Traitement de patients atteints de cancer* Des conférences en endodontie et orthodontie seront annoncées ultérieurement. Entretiens cliniques
Anglais:	Dr Gerald E. Denehy, Iowa *Getting the most out of composite resins* Dr Glen McGivney, Milwaukee *Removable Partial Dentures* Dr Doksoo Ahn — Dr David Auerbach — Dr Charles Dixter — Dr Timothy Head — Dr Ivan Stangel — Dr Martin Tyler *Clinical Pot-Pourri* Dr Peter Vaktor *C.P.R.* Dr. Arnold Aaron, New-York Dr Robert Langlais, Texas *Oral Pathology* Table Clinics
Jeudi 12 avril 1984	
Français:	Dr Ronald Jones, Montréal *Occlusion* Dr Hélène Lemay, Montréal *Pharmacologie* Dr Pierre Desautels, Montréal *Matériaux dentaires*
Anglais:	Dr Harvey Weiner, Fort Lauderdale *Endodontics* Dr Monica Belcourt, Montréal *Time Management* Dr William Shaw *Computers in Dentistry*

Organisations participantes et réunions spéciales

Plusieurs organisations et associations ont déployé leurs efforts afin de faire coïncider leurs réunions avec Les Journées dentaires. Les associations suivantes y contribuent de façon directe

- CANADIAN ACADEMY OF PERIODONTOLOGY
- CANADIAN ACADEMY OF PAEDODONTICS
- CANADIAN ASSOCIATION OF ORTHODONTISTS

Ci-dessous mentionnées quelques-unes des autres organisations qui participeront à ce congrès:

- ROYAL COLLEGE OF DENTISTS OF CANADA
- C.D.S.P.I.
- CANADIAN ACADEMY OF ORAL RADIOLOGY

The Canadian Dental Hygienists' Association
L'Association canadienne des hygiénistes dentaires

Scientific Program/Programme Scientifique

Tuesday, April 10 1984 — Mardi, le 10 avril 1984

Simultaneous translation in both languages all day.

Traduction simultanée dans les deux (2) langues toute la journée

Pat Johnson, CDHA, Ontario
"The past twenty years"

Sylvie de Grandmont, Montréal
"Le role de la Corporation"

Sharon Amer-French, Ontario
"The next twenty years"

Kim Ball, Ontario
"Financial Planning"

In addition all scientific lectures are open to Dental Hygienists.

Toutes les conférences scientifiques sont ouvertes aux Hygiénistes Dentaires.

Wednesday, April 11 1984 — Mercredi, le 11 avril 1984

English	Docteur Samuel Green, Ontario "Creative Marketing in the Public Health Industry"	Anglais
English	Christine Wooley, Montréal "Dental Hygiene Residency"	Anglais
French	Sylvie Frechette, Montréal Judith Langlois, Montréal "Les enfants handicapés"	Français
Bilingual	Table Clinics/Entretiens Cliniques	Bilingue
	Audio-Visual/Audio-Visuel	

Thursday, April 12 1984 — Jeudi, le 12 avril 1984

Scientific Programs open to all/Programmes Scientifiques ouverts à tous

Social Program/Programme Social

All these functions and more are included in the $75.00 registration fee

Toutes ces activités et plus sont incluses dans les frais d'inscription soit $75.00

Tuesday, April 10 1984 — Mardi, le 10 avril 1984

President's Luncheon/Déjeuner du Président
"April in Montreal"/"Avril à Montréal"

Wednesday, April 11 1984 — Mercredi, le 11 avril 1984

Wine and cheese reception/Dégustation de vins et fromages

Additional social events are available to CDHA members.

Événements sociaux additionnels sont disponibles aux membres de l'ACHD.

Canadian Dental Assistants Association
Association canadienne des assistants (es) dentaires
The Quebec Dental Assistants Association
L'Association des assistants (es) dentaires du Québec

Scientific Program/Programme Scientifique

Tuesday, April 10 1984 — Mardi, le 10 avril 1984

French — Docteur Robert Lawlor, Montréal — Français
"L'hépatite B"

Wednesday, April 11 1984 — Mercredi, le 11 avril 1984

Simultaneous translation — Patricia Burger, Illinois — **Traduction simultanée**
"Touch your patient with love"

Thursday, April 12 1984 — Jeudi, le 12 avril 1984

English — Docteur Monica Belcourt, Montréal — Anglais
"Time Management"

Social Program/Programme Social

Tuesday, April 10 1984 — Mardi, le 10 avril 1984

Tuesday Evening "April in Montreal"/Soirée "Avril à Montréal

Wednesday, April 11 1984 — Mercredi, le 11 avril 1984

Maple Camp Party/Soirée à l'érablière

All activities listed are included in the $60 registration fee. Additional social events available to CDAA and QDAA members.

Toutes ces activités dans le liste sont incluses dans le frais d'inscription soit $60. Les membres de l'ACAD et de l'AADQ recevront des billets additionnels pour les évènements sociaux.

Business Meetings/Réunions d'Affaires

CDAA annual meeting/Réunion annuelle de l'ACAD
QDAA annual meeting/Réunion annuelle de l'AADA

DENTAL TECHNICIAN PROGRAM UNDER THE AUSPICES OF THE CORPORATION OF DENTAL TECHNICIANS OF QUEBEC

TUESDAY, April 10, 1984/MARDI 10 avril 1984

Mr. Bo Braze, Alabama
Modern Ceramic, Technique in Dentistry

In addition all scientific lectures are open to Dental Technicians who are members of the CPTDQ.

PROGRAMME DES TECHNICIENS DENTAIRES SOUS L'ÉGIDE DE LA CORPORATION DES TECHNICIENS DENTAIRES DU QUÉBEC

WEDNESDAY, April 11, 1984/MERCREDI 11 avril 1984

Dr. Arnold Aaron, New-York

Table Clinics/Entretiens cliniques

Audio-visual Program/Programme audio-visuel

De plus, toutes les conférences scientifiques sont ouvertes aux techniciens dentaires membres de la CPTDQ.

SOCIAL PROGRAM/PROGRAMME SOCIAL

Technicians have access to social programs such as April in Montreal and the Presidents Ball. These programs are not included in a general registration fee. (see registration form)

Tous les techniciens ont accès aux programmes sociaux tels que la soirée Avril à Montréal et la soirée des Présidents. Toutefois, ces évènements ne sont pas inclus dans l'inscription générale. (voir formulaire d'inscription)

PROGRAMME SOCIAL/SOCIAL PROGRAM

Tuesday April 10/Mardi le 10 avril

AVRIL À MONTRÉAL

HÔTEL REINE ÉLIZABETH
20 h — 1 h

Buffet chaud et froid "à la Québécoise"
Spectacle surprise:
Chants et danses...
De l'animation plein la vue!
Danse continuelle

APRIL IN MONTREAL

QUEEN ELIZABETH HOTEL
20 h — 1 h

Hot and cold buffet "à la Québécoise"
Surprise Show:
Song and dance...
Spectacular entertainment!
Non-stop dancing

Wednesday April 11/Mercredi le 11 avril

LA SOIRÉE DE GALA DES PRÉSIDENTS

CENTRE SHERATON
20 h — 1 h

Une soirée éblouissante en l'honneur des Présidents de l'Association dentaire Candienne et de l'Ordre des dentistes du Québec.

Repas de gourmet...
Décor magnifique...
Danse au son d'un grand orchestre...
Une soirée inoubliable.

PRESIDENTS' GALA EVENING

SHERATON CENTER HOTEL
20 h — 1 h

A dazzling evening in honour of the Presidents of The Canadian Dental Association and the Ordre des dentistes du Québec.

Gourmet meal...
Magnificent décor...
Dancing to the Big Band rhythm...
A memorable evening.

PROGRAMME DES CONJOINTS/SPOUSES' PROGRAM

HOTEL REINE ELIZABETH

Pas un moment d'ennui!

Un programme complet couvrant toute la durée du congrès est offert en anglais et en français.

Tous les goûts seront satisfaits.

Une seule inscription donnera accès à tout le congrès.

Toutes les conférences du programme scientifique sont ouvertes aux conjoints. La soirée "Avril à Montréal" est incluse dans l'inscription.

Extraits du programme:

- Matinée à la Bourse
- Cours sur l'Analyse personnelle des couleurs
- Visite du Centre commercial Rockland
- Visites touristiques de Montréal
- Dégustation de vins
- Petit-déjeuner et conférence sur le "Time Management"

QUEEN ELIZABETH HOTEL

Never a dull moment!

Throughout the convention, a complete program is offered, both in French and in English.

There will be something for everyone.

One simple registration will open the doors of the whole convention. Spouses have access to all the conferences in the scientific program. Admission to the "April in Montréal" evening is included in the registration.

Program highlights:

- Morning at the Montréal Stock Exchange
- Seminar on personal analysis through color
- Tour of the Rockland Shopping Centre
- Sightseeing tours of Montréal
- Wine tasting
- Breakfast and conference on Time Management

DEMANDE DE RÉSERVATION D'HÔTEL

(Si vous désirez réserver plus d'une chambre, veuillez faire une copie de ce formulaire et le remplir conformément)

NOM _____
(lettres moulées)

ADRESSE _____

_____
(incluant province, pays et code postal)

TÉLÉPHONE (bureau) _____ (Domicile) _____

TITRE (VEUILLEZ INDIQUER LE TITRE APPROPRIÉ ____ Dentiste ____ Hygiéniste ____ Assistant (e)

____ Technicien (ne) ____ Étudiant (e) ____ Exposant

____ Autre (veuillez préciser) _____

CHOIX D'HÔTEL:

Le Reine Élizabeth (Quartier général du Congrès conjoint de l'Ordre des dentistes du Québec et de l'Association dentaire canadienne — Les Journées Dentaires 1984)

☐ Simple ..... $75.00 ☐ Autre (veuillez spécifier) .....

☐ Double/Jumeaux ..... $75.00 .....

Le Centre Sheraton (QUARTIER GÉNÉRAL DES HYGIÉNISTES ET ASSISTANTS (ES)

☐ Simple ..... $75.00 ☐ Autre (veuillez spécifier) .....

☐ Double/Jumeaux $75.00

Date et heure d'arrivée _____

Date du départ _____

VOTRE RÉSERVATION SERA CONFIRMÉE DIRECTEMENT PAR L'HÔTEL. TOUT CHANGEMENT DE VOTRE RÉSERVATION DEVRA ÊTRE FAIT DIRECTEMENT AVEC L'HÔTEL.

ENVOYER À:
CONGRÈS CONJOINT DE L'ORDRE DES DENTISTES DU QUÉBEC ET DE L'ASSOCIATION DENTAIRE CANADIENNE
3565, rue Berri, Suite 200
Montréal, Québec H2L 4G3

C'EST OFFICIEL

Votre réunion a été enregistrée à notre Centrale de Congrès, un bureau de réservations exclusif d'Air Canada au service des délégués de congrès. Les avantages sont les suivants:

TARIF DE CONGRÈS*

Notre tarif vous permet d'économiser au moins 20%. Il ne vous est offert qu'à la Centrale de Congrès. Si vous êtes admissible à d'autres tarifs plus économiques, vos réservations seront effectuées au tarif le plus avantageux pour vous.

LOCATION DE VOITURE

Si vous désirez une voiture dès votre arrivée, Air Canada a conclu une entente avec Hertz qui vous permettra de réaliser des économies substantielles. Ce tarif intéressant n'est offert aux délégués qu'à la Centrale de Congrès.

Hertz®

VOICI CE QUE VOUS DEVEZ FAIRE

Composez notre numéro (sans frais), identifiez-vous ainsi que votre congrès et nos spécialistes en congrès s'occuperont du reste. Si vous avez l'habitude d'utiliser un service de voyages incorporé dans votre compagnie, ou un agent de voyages, demandez-leur de nous appeler en votre nom. Ils peuvent obtenir pour vous les mêmes avantages.

Appelez "La ligne aérienne en tête pour les congrès". . . les jours ouvrables, entre 9h et 20h, HAE/HNE.

*Certaines conditions d'achat à l'avance sont applicables

CENTRALE DE CONGRÈS
AIR CANADA

Guide pour l'inscription

Formulaire d'inscription

1. Veuillez remplir et retourner un seul formulaire par personne — seul le nom du conjoint doit figurer sur le formulaire du congressiste. Un seul chèque peut cependant être attaché avec plusieurs formulaires. Certains évènements sociaux ne sont pas inclus dans le tarif de base et doivent s'y additionner. Veuillez bien prendre connaissance des informations données dans le formulaire.
2. Un accusé réception vous sera envoyé confirmant tous les détails relatifs à votre inscription.
3. Les Journées dentaires 1984 sont divisées en deux (2) parties:
   a) Pré-congrès — Hôtel Reine Elizabeth (8-9 avril)
   Votre inscription au pré-congrès donne accès à la (ou les) conférence(s) réservées de votre choix. Cette inscription est totalement indépendante de l'inscription au congrès lui-même.
   b) Congrès — Palais des Congrès (10-11-12 avril)
   Conférences
   Exposition commerciale
   Programmes pour auxiliaires
   Programme audio-visuel
   Entretiens cliniques

   ***

   Programme social (Hôtel Reine Elizabeth et Centre Sheraton)
   Programme des conjoints (Hôtel Reine Elizabeth)
4. Date limite pour l'inscription: les pré-inscriptions doivent être envoyées avant le 28 février 1984. Tout formulaire reçu après cette date sera retourné et l'inscription devra se faire sur place et sera majorée de $10.00 par personne.
5. Toutes les personnes pré-inscrites (avant le 28 février) seront éligibles à un tirage de deux (2) billets pour toute destination desservie par Air Canada.

Réservation d'avion

Une entente a été établie avec AIR CANADA afin de vous faire bénéficier d'un bureau exclusif d'AIR CANADA au service des délégués de congrès.
Pour plus d'informations, veuillez consulter l'annonce.

Réservation d'hôtel

Deux (2) hôtels offrent un tarif spécial de $75.00 (chambre simple ou double)

- Hôtel Reine Elizabeth:
  - Quartier général des Journées dentaires de l'Association Dentaire Canadienne et de l'Ordre des dentistes du Québec.
  - Séances réservées des 8-9 avril
  - Soirée "Avril à Montréal"
  - Programme des conjoints
- Centre Sheraton:
  - Quartier général des hygiénistes et assistant(e)s
  - Soirée de gala des Présidents

NOTE: Tous les formulaires de réservation d'hôtel devront être retournés au siège social du congrès.

Les Journées Dentaires 1984
Congrès conjoint de l'Ordre des dentistes du Quebec et de l'Association dentaire canadienne
3565, rue Berri, Suite 200, Montréal, Qué., H2L 4G3

8 au 12 avril 1984

PRÉ-INSCRIPTION — DOIT ÊTRE ENVOYÉE AVEC CHÈQUE AVANT LE 28 FÉVRIER 1984. TOUTES LES PERSONNES PRÉ-INSCRITES, AVANT LE 28 FÉVRIER, SERONT ÉLIGIBLES POUR UN TIRAGE D'AIR CANADA. LES INSCRIPTIONS FAITES SUR PLACE SERONT MAJORÉES DE $10.00

UNE FORMULAIRE PAR PERSONNE
PHOTOCOPIER POUR PLUSIEURS INSCRIPTIONS

NOM _____

ADRESSE _____ Code Postal _____

NUMÉRO DE TÉLÉPHONE (Bur.) _____ (Résidence) _____

NOM DU CONJOINT, s'il participe _____

S.V.P. COCHEZ LA CASE APPROPRIÉE:

☐ DENTISTE ☐ HYGIÉNISTE ☐ ASSISTANT(E) ☐ TECHNICIEN(NE) ☐ CONJOINT

PRÉ-CONGRÈS — SÉANCES RÉSERVÉES — 8-9 AVRIL — HÔTEL REINE ELIZABETH

Anglais

8 AVRIL DR FRANCIS EDWARDS, **MARKETING OF YOUR PROFESSIONAL SERVICE** ..... Dr ..... 75.00 _____

(Traduction simultanée disponible) / Ass., Hyg. ..... 35.00 _____

9 AVRIL DR ALVIN FILLASTRE, **PREDICTABLE RESTORATIVE PROCEDURES** ..... Dr, Tech. ..... 75.00 _____

Français

8 AVRIL A.M. DR PIERRE DUQUETTE, **CONFERENCE CLINICO-PATHOLOGIQUE*** (Programme 1983 en reprise) Dr ..... 40.00 _____

P.M. DR ROBERT LANGLAIS, **CONFERENCE CLINICO-PATHOLOGIQUE*** ..... Dr ..... 40.00 _____

*À participation active

9 AVRIL DR ALAIN VAILLANCOURT & COLLABORATEURS*, **JOURNÉE D'ÉTUDE EN PROTHÈSE COMPLÈTE** Dr, Tech. ..... 75.00 _____

* — DR CLAUDE LAMARCHE — DR NORMAND TARDIF
— DR HUAN PHAM —— DR JACQUES VALIQUETTE — DR ALDO CAMARDA

continué . . .

Formulaire d'inscription continué

CONGRÈS — 10, 11 et 12 AVRIL — LE PALAIS DES CONGRÈS

S.V.P. COCHEZ LA CASE APPROPRIÉE:

☐ DENTISTE/membre de l'Ordre des dentistes du Québec
Frais d'inscription inclus dans le permis de pratique ..... nil _____
Inclus: accès aux programmes scientifiques, exposition commerciale, trois (3) déjeuners, programme social, réservation séparée (voir ci-dessous)

DENTISTE/hors du Québec
Inclus: accès aux programmes scientifiques, exposition commerciale, trois (3) déjeuners, lundi cocktail de Bienvenue, mardi soirée (Avril à Montréal, Soirée des Presidents, réservation séparée (voir ci-dessous)

☐ Membre ADC/Membre ADA/Dentiste étranger ..... 195.00 _____

☐ Non-membre ADC ..... 225.00 _____

10 avril RCP cours limité à 40 personnes Assistera ☐ Oui ☐ non ..... nil Ø

ÉVÈNEMENTS SOCIAUX

☐ MARDI SOIRÉE — **AVRIL À MONTRÉAL** (inclus dans certaines inscriptions au congrès) •par personne/20.00 _____

☐ MERCREDI SOIRÉE — **SOIRÉE DE GALA DES PRÉSIDENTS** (pas inclus dans aucune inscription)

par personne/40.00 _____

☐ CONJOINT ..... par personne/50.00 _____
Inclus: accès aux programmes scientifiques, exposition commerciale, mardi soirée (Avril à Montréal), analyse personnelle des couleurs, journée de "shopping", visites touristiques de Montréal, dégustation de vins, petit déjeuner au champagne, visite à la Bourse (certains programmes, ont des places limitées — réservations sur une base de premier arrivé, premier servi, sur place seulement)

☐ HYGIÉNISTE ..... 75.00 _____
Inclus: accès aux programmes scientifiques, exposition commerciale, conférences de ACHD, mardi déjeuner du président, mardi soirée (Avril à Montréal), mercredi dégustation de vins et fromages — évènements sociaux additionnels offerts aux membres de ACHD — Plus d'information lors de l'inscription.

☐ ASSISTANT(E) ..... 60.00 _____
Inclus: accès aux programmes scientifiques, exposition commerciale, conférences de ACAD/AADQ/AADM, mardi soirée (Avril à Montréal), mercredi soir (Soirée à l'Erablière), — les membres de ACAD/AADQ/AADM recevront des billets pour des évènements sociaux additionnels — Plus d'information lors de l'inscription

☐ TECHNICIEN(NE) ..... $60.00 _____
Inclus: accès aux programmes scientifiques, exposition commerciale, — évènements sociaux, réservation séparée (voir ci-dessus)

☐ ÉTUDIANT ..... nil _____
Inscription sur place seulement: Pour les finissants des écoles de médecine dentaire, assistant(e) dentaire, hygiéniste dentaire et technicien (ne) dentaire

Inclus: accès aux programmes scientifiques, exposition commerciale

TOTAL: _____

S.V.P. FAIRE LE CHÈQUE PAYABLE À:

LES JOURNÉES DENTAIRES 1984
Congrès conjoint de l'Ordre des dentistes du Québec et de l'Association Dentaire Canadienne
3565, rue Berri
Suite 200
Montréal, Québec
H2L 4G3

POLITIQUE D'ANNULATION: Les annulations seront **acceptés avant le 15 mars** pour un remboursement complet. Toutes annulations après cette date seront sujet à une charge administrative de 25%.

TOUTES LES PERSONNES PRÉ-INSCRITES AVANT LE 28 FÉVRIER SERONT ÉLIGIBLES À UN TIRAGE DE DEUX BILLETS POUR TOUT DESTINATION DÉSSERVIE PAR AIR CANADA!

CONSEIL D'ADMINISTRATION
AVIS D'ASSEMBLÉE

L'Assemblée intérimaire du Conseil d'administration de l'Association dentaire canadienne aura lieu les 8-9 avril 1984 à l'hôtel Reine Elizabeth, à Montréal, Qué. Elle débutera à 9 heures le 8 avril.

On vous signale que les assemblées du Conseil d'administration sont ouvertes à tous les membres de l'ADC.

Le Conseil d'administration comprend 25 membres qui représentent tous les membres de l'ADC à travers le Canada. Un administrateur représente 500 membres. Les groupes formés par les Services dentaires des Forces armées canadiennes et par les membres étudiants ont un représentant chacun.

Si vous projetez d'assister au Congrès conjoint 1984 de l'ADC et de l'ODQ qui aura lieu à Montréal, on vous invite à entendre une partie des délibérations du Conseil d'administration afin d'apprendre comment se prennent les décisions politiques qui, au Canada, touchent la profession dentaire en tant qu'organisme.

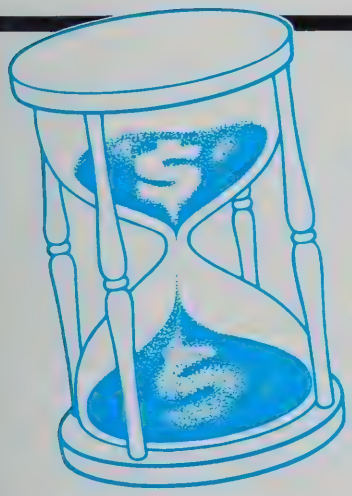
Au moment de mettre sous presse, cette liste était exacte. Cependant elle a pu être modifiée suivant l'élection de nouveaux administrateurs provinciaux.

Voir la liste des administrateurs de l'ADC et des régions qu'ils en page 67.

AUJOURD'HUI, NOUS AVONS BESOIN DE VOUS. ET SI, DEMAIN, C'ÉTAIT VOUS?

Donnez du fond du coeur.

La Fondation canadienne des maladies du coeur.



L'HEURE DES REER EST ARRIVÉE!

POUR ÊTRE DÉDUCTIBLES DU REVENU IMPOSABLE DE 1983, LES COTISATIONS AUX REER DOIVENT ÊTRE VERSÉES AU PLUS TARD LE

29 FÉVRIER 1984.

Si vous n'avez pas encore versé votre cotisation, **VOUS N'AVEZ PLUS UN INSTANT À PERDRE.** Faites-le dès aujourd'hui afin de profiter pleinement de la déductibilité fiscale et d'investir pour bâtir une sécurité financière en prévision de votre retraite.

Les personnes travaillant pour leur propre compte peuvent verser une cotisation maximum de $ 5 500 par an. Avec le REER de l'ADC, la **TOTALITÉ** de la cotisation est portée à votre compte.

Le REER de l'ADC comporte des caractéristiques uniques, notamment un choix de quatre fonds et la possibilité de transfert d'un fonds à l'autre.

Pour obtenir une brochure et un formulaire de demande, contactez l'administrateur du REER au CDSPI:

Régime enregistré d'épargne retraite

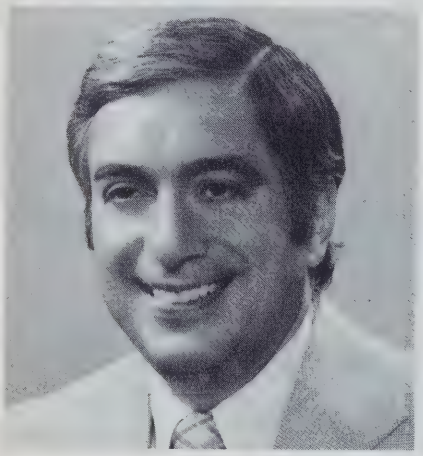
1.800.268.54.18	Provinces de l'Ouest, provinces atlantiques et région de l'Ontario avec l'indicatif régional 807
1.800.268.34.11	Québec et Ontario, ***sauf*** pour la région avec l'indicatif régional 807
497.71.17	Toronto et environs

Le REER de l'ADC est un service offert par l'Association dentaire canadienne à ses membres et administré par le ***Canadian Dental Service Plans Inc.***

En bref —

Le Dr Frank Shamy, de Montréal, est devenu officiellement le président de l'Association canadienne des orthodontistes (ACO) lors de la 35e Assemblée annuelle de l'association tenue en septembre dernier, juste avant le Congrès de l'ADC.

Les autres membres de l'Exécutif sont: les Drs Robert Hicks, de Vancouver (président sortant); Ian Milne, d'Ottawa (président désigné); Morley Bernstein, de Winnipeg (premier vice-président); Oleg Kopytov, de Montréal (deuxième vice-président); et J.L. Ares, d'Edmonton (directeur exécutif).



Le Dr F. Shamy

Le Conseil d'administration de l'ACO comprend encore un représentant élu de chacune des sociétés d'orthodontie de la Colombie-Britannique, de l'Alberta, de la Saskatchewan, du Manitoba, de l'Ontario et des Maritimes.

Le Dr Walter Pilutik, de New Westminster, en Colombie-Britannique, dirige le Comité du bulletin. Les autres directeurs de comité sont les Drs Morley Bernstein, de Winnipeg (recrutement); Richard Pass, de Burlington, en Ontario (assurances); et Oleg Kopytov (budget).

L'ACO prépare déjà sa 36e Assemblée annuelle. Celle-ci aura lieu conjointement avec le Congrès de l'ADC et de l'ODQ et sera tenue du 8 au 10 avril, à l'Hôtel Bonaventure de Montréal.

L'ACO a retenu les services de conférenciers éminents. Le Dr Richard Litt demandera si l'orthodontie chirurgicale est une science ou un art, le Dr Robert Rubin parlera des conséquences de l'obturation nasale sur la croissance faciale et l'occlusion, et le Dr Tom Graber commentera la fonction et la dysfonction des articulations temporo-mandibulaires ainsi que leur diagnostic et leur traitement. Le Dr Graber prononcera aussi la Conférence Grieve Memorial, le 10 avril.

Pour des renseignements additionnels sur cette prochaine assemblée, veuillez contacter le Dr Kopytov (3535, chemin Queen Mary, pièce 309, Montréal, Québec, H3V 1H8; (514) 735-4246).

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L'Association des Périodontistes du Québec a récemment élu un nouvel exécutif.

Le Dr Jean Pierre Masson, nouveau Président, succède au Dr Sam Galperin, Président sortant. Le Dr Mervin Werbitt est le nouveau Vice-président et le Dr Allen Shapiro le nouveau Secrétaire-trésorier.

Les quatre membres de l'exécutif de l'Association sont résidents à Montréal, Québec.

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Le Fonds canadien pour l'enseignement dentaire (FCED) accepte maintenant les demandes de bourse dans deux catégories.

La première catégorie s'adresse à des professeurs ou à des chercheurs pour l'année universitaire 1984-85. Les candidats doivent être citoyens canadiens ou immigrants reçus, avoir terminé un cours universitaire en dentisterie, en hygiène dentaire ou en sciences, et être admissibles aux études supérieures.

De plus, ils doivent déclarer qu'ils ont la ferme intention de devenir professeurs ou chercheurs dans une école dentaire canadienne ou de participer à un programme de formation pour les auxiliaires dentaires. On accordera la préférence à ceux qui comptent occuper ensuite un poste de professeur ou de chercheurs à temps complet. Le nombre des bourses et leur valeur seront fixés plus tard.

L'autre catégorie s'adresse à un profeseur qui enseigne la dentisterie dans une université. Il s'agit d'un prix d'une valeur de 2 500$ offert par la firme *Warner-Lambert Canada Inc.* Les candidats doivent être membres à temps complet du personnel enseignant d'une école dentaire canadienne et posséder une expérience d'au moins cinq ans dans l'enseignement.

Pour obtenir cette bourse, il faut proposer un programme bien précis qui sera avantageux autant pour la personne que pour son école. Le programme doit être d'une durée d'au moins un mois. Cependant, les programmes plus courts seront pris en considération.

La date limite pour poser sa candidature aux deux bourses est le 1er mars 1984. Pour plus de renseignements, veuillez communiquer avec le FCED, 234 St. George Street, Suite 202, Toronto, Ontario, M5R 2P1; (416) 928-0484.

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Le Collège des chirurgiens dentistes de la Saskatchewan vient d'élire ses nouveaux officiers pour l'année 1984. Le Dr W.P. Reed, de Regina, occupera la présidence et le Dr G.A. Riekman, de Saskatoon, la vice-présidence.

Un nouveau membre du Collège a été élu au Conseil pour un mandat de deux ans. Il s'agit du Dr G. Howard, de Prince-Albert.

Selon le Dr George Peacock, secrétaire général du Collège, les nominations sont entrées en vigueur le 1er janvier 1984.

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Du 19 au 24 janvier 1984, aura lieu dans l'île Maui, en Hawaii, la deuxième assemblée internationale en dentisterie esthétique (*Second International Cosmetic Dentistry Extravaganza*) parrainée conjointement par *Den-Mat Corporation* et le *Journal of Cosmetic Dentistry*.

La première assemblée a eu lieu

l'été dernier au *Epcot Centre* de *Disney World,* en Floride, et a remporté un grand succès. Plus de 350 dentistes des États-Unis et du Canada y ont participé. Des experts en dentisterie esthétique y ont tenu des séminaires touchant les dernières techniques dans cette discipline et ont présenté des démonstrations cliniques.

Parmi les conférenciers, on remarquait les Drs Ronald Jordan (Université Western Ontario), Ralph Phillips (Université de l'Indiana), Irwin Smigel (président de la Société américaine d'esthétique dentaire) Harold Horn (Université de New York) et Richard Simonsen (Université du Connecticut).

Les dentistes canadiens qui ont pris part à l'assemblée venaient de l'Ontario, du Québec, de l'Alberta, du Manitoba et de la Colombie-Britannique.

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Le Dr Michael W. Lasko est l'heureux gagnant du tirage qui a eu lieu lors du Congrès des CDSPI tenu à Vancouver le 18 octobre dernier.

Originaire de Winnipeg, au Manitoba, le Dr Lasko a reçu un certificat de 500$ échangeable contre un téléviseur couleur.

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Nous venons de recevoir le premier numéro du bulletin mensuel *The Bottom Line* et il semble qu'il soit promu à un brillant avenir.

S'adressant aux directeurs des petites entreprises, le bulletin comprend quatre pages remplies de conseils pratiques touchant la gestion financière et l'administration générale.

Paru en octobre, le numéro de lancement répond à diverses questions d'intérêt: comment le banquier évalue-t-il le crédit d'une compagnie? que choisir: le salaire ou les dividendes? que sont les Régimes de placements en titres indexés (RPTI)? et comment s'y prend-on pour vendre au gouvernement?

La firme torontoise *Lawrence Publishing Inc.,* qui publie le bulletin, promet d'y présenter les dernières informations touchant l'impôt sur le revenu, la gestion de la trésorerie et la planification d'inventaire, ainsi que des interviews et des articles spéciaux pour améliorer la gestion d'une entreprise. "Le but de *The Bottom Line,* affirme l'éditeur, est d'aider le lecteur à faire de meilleures affaires en perfectionnant ses aptitudes pour la gestion financière."

L'abonnement est de 72$ par année. Les intéressés peuvent communiquer avec: Lawrence Publishing Inc., 1540 Eglinton Avenue West, Toronto, Ontario, M6E 2G8; (418) 787-0156.

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L'Association dentaire canadienne reçoit souvent des demandes de renseignements de la part du public et des membres de la profession.

La fluoruration constitue le sujet le plus populaire et l'ADC distribue gratuitement des publications qui traitent cette question. Il y en a quatre en tout, les deux premières étant offertes à tous ceux qui en font la demande. Il s'agit de *La Fluoruration de l'eau: analyse de certaines critiques* et *Déclaration de principe de l'ADC sur la fluoruration contrôlée.* Les deux autres publications sont réservées aux membres de l'ADC, aux organismes provinciaux et aux sociétés associées ou affiliées. Ce sont *Le Guide de l'ADC concernant les campagnes locales de fluoruration* et *Le Guide de l'ADC concernant les campagnes provinciales de fluoruration.*

Pour obtenir ces publications ou d'autres renseignements, veuillez communiquer avec la division des Communications de l'ADC.

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Gauche à droite: Le Dr. R. Phillps, University of Indiana; Le Dr. Harold R. Horn, New York University, Pamorsini, Den-Mat Corporation.

L'Académie canadienne de pathologie buccale a procédé récemment à l'élection de ses officiers pour les années 1984 et suivantes.

Le nouveau président est le Dr G. Wysocki, de London (Ontario), et le président désigné, le Dr David Mock, de Toronto. Le vice-président et le secrétaire-trésorier sont, respectivement, les Drs D.G. Gardner, de London (Ontario), et R. Priddy, de Vancouver.

De plus, on a désigné les membres de trois comités. Les Drs Priddy, W. Maxymiw (Toronto) et B. Harsanyi (Halifax) sont affectés au Comité des nominations; les Drs R.J. McComb (Toronto), B. Blasberg (Vancouver) et J. Hardie (Ottawa), à celui du recrutement; et les Drs R. Morency (Montréal), T. McGaw (Edmonton) et M. Cohen (Halifax), à celui des relations professionnelles et publiques.

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L'Association dentaire canadienne est toujours en pourparlers avec Revenu Canada au sujet de l'imposition des sociétés de gestion.

Récemment, une lettre a été envoyée au directeur général de la Direction de l'observation, précisant les points de vue de l'ADC à ce sujet. Au début de décembre, l'ADC a fait parvenir à tous ses membres, par l'intermédiaire de son Communiqué trimestriel, une lettre expliquant ses idées et incitant les membres à contacter leurs députés respectifs.

Pour plus de renseignements, veuillez communiquer avec le siège social de l'ADC.

Motrin®

(ibuprofen) tablets

Product Information

Action: Ibuprofen has demonstrated anti-inflammatory, analgesic and antipyretic activity in animal studies designed to specifically demonstrate these effects. Ibuprofen has no demonstrable glucocorticoid effect

Following a single 200 mg dose of ibuprofen in humans, useful blood levels were demonstrable in 45 minutes and still present in six hours but at barely detectable levels. Peak levels occurred at approximately one hour after ingestion. Levels were lower when taken in conjunction with food.

Ibuprofen is rapidly metabolized and eliminated in the urine. The excretion of ibuprofen is virtually complete 24 hours after the last dose The serum half-life of ibuprofen is 1.8 to 2 hours. There is no evidence of drug accumulation or enzyme induction

Ibuprofen has been found to be less likely to cause gastro-intestinal bleeding in doses usually used than is acetylsalicylic acid

Clinical trials in man have shown activity of a dose of 1200–1800 mg of ibuprofen daily to be similar to that of 3.6 grams of acetylsalicylic acid daily.

Indications and Clinical Uses: Motrin (ibuprofen) is indicated for the treatment of rheumatoid arthritis and osteoarthritis Motrin is also indicated for the relief of mild to moderate pain accompanied by inflammation in conditions such as musculo-skeletal trauma and post-dental extraction. Motrin is also indicated for the relief of pain associated with dysmenorrhea.

Contraindications: Motrin (ibuprofen) should not be used in patients who have previously exhibited hypersensitivity to it, or in individuals with the syndrome of nasal polyps, angioedema and bronchospastic reactivity to acetylsalicylic acid or other nonsteroidal anti-inflammatory agents. (see WARNINGS)

Motrin should not be used during pregnancy, in nursing mothers or in pediatric patients because its safety under these conditions has not been established.

Warnings: Anaphylactoid reactions have occurred in patients with known A.S.A. hypersensitivity (see CONTRAINDICATIONS).

Peptic ulceration and gastrointestinal bleeding, sometimes severe, have been reported in patients receiving Motrin (ibuprofen). Peptic ulceration, perforation, or severe gastrointestinal bleeding can have a fatal outcome, and although few such reports have been received with Motrin, a cause and effect relationship has not been established. Motrin should be given under close supervision to patients with a history of upper gastro-intestinal tract disease

Precautions: Blurred and/or diminished vision, scotomata, and/or changes in colour vision have been reported. If a patient develops such complaints while receiving Motrin (ibuprofen), the drug should be discontinued and the patient should have an ophthalmologic examination.

Fluid retention and edema have been reported in association with Motrin therefore, the drug should be used with caution in patients with a history of cardiac decompensation or renal disease

Motrin, like other nonsteroidal anti-inflammatory agents, can inhibit platelet aggregation but the effect is quantitatively less and of shorter duration than that seen with acetylsalicylic acid. Motrin has been shown to prolong bleeding time (but within the normal range) in normal subjects. Because this prolonged bleeding effect may be exaggerated in patients with underlying hemostatic defects, Motrin should be used with caution in persons with intrinsic coagulation defects and those on anticoagulant therapy.

Patients on Motrin should be cautioned to report to their physicians signs or symptoms of gastrointestinal ulceration or bleeding, blurred vision or other eye symptoms, skin rash, weight gain, or edema.

When Motrin is added to the treatment program of patients who have been on prolonged corticosteroid therapy, and it is decided to discontinue this therapy, the corticosteroid should be tapered slowly to avoid exacerbation of disease or adrenal insufficiency.

Aseptic meningitis has been reported in connection with Motrin therapy in patients with systemic lupus erythematosus. Such patients may also develop hypersensitivity reactions to Motrin such as fever, rash or abnormal liver function more often than those with other disorders. Caution should therefore be exercised when considering Motrin therapy for patients with systemic lupus erythematosus.

Drug Interactions

Coumarin-type anticoagulants: Several short-term controlled studies failed to show that Motrin significantly affected prothrombin times or a variety of other clotting factors when administered to individuals on coumarin-type anticoagulants. However, because bleeding has been reported when Motrin and other nonsteroidal anti-inflammatory agents have been administered to patients on coumarin-type anticoagulants, the physician should be cautious when administering Motrin to patients on anticoagulants.

A.S.A: Animal studies show that A.S.A. given with nonsteroidal anti-inflammatory agents including Motrin yields a net decrease in anti-inflammatory activity with lowered blood levels of the non-A.S.A. drug. Single dose bioavailability studies in normal volunteers have failed to show an effect of A.S.A. on Motrin blood levels. Correlative clinical studies have not been done.

Adverse Reactions: The following adverse reactions have been noted in patients treated with Motrin (ibuprofen):

Note: Reactions listed below under Causal Relationship Unknown are those which occurred under circumstances where a causal relationship could not be established. However, in these rarely reported events, the possibility of a relationship to Motrin cannot be excluded.

Gastrointestinal: The adverse reactions most frequently seen with Motrin therapy involve the gastrointestinal system.

Incidence 3 to 9%: nausea, epigastric pain, heartburn

Incidence 1 to 3%: diarrhea, abdominal distress, nausea and vomiting, indigestion, constipation, abdominal cramps or pain, fullness of the gastrointestinal tract (bloating or flatulence)

Incidence less than 1%: gastric or duodenal ulcer with bleeding and/or perforation, gastrointestinal hemorrhage, melena, hepatitis, jaundice, abnormal liver function (SGOT, serum bilirubin and alkaline phosphatase).

Central Nervous System:

Incidence 3 to 9%: dizziness

Incidence 1 to 3%: headache, nervousness

Incidence less than 1%: depression, insomnia

Causal relationship unknown: paresthesias, hallucinations, dream abnormalities

Dermatologic:

Incidence 3 to 9%: rash (including maculopapular type)

Incidence 1 to 3%: pruritus

Incidence less than 1%: vesiculobullous eruptions, urticaria, erythema multiforme

Causal relationship unknown: alopecia, Stevens-Johnson syndrome

Special Senses.

Incidence 1 to 3%. tinnitus

Incidence less than 1%: amblyopia (blurred and/or diminished vision, scotomata and/or changes in colour vision). Any patient with eye complaints during Motrin therapy should have an ophthalmological examination (see PRECAUTIONS)

Causal relationship unknown: conjunctivitis, diplopia, optic neuritis

Metabolic:

Incidence 1 to 3%: decreased appetite, edema, fluid retention. Fluid retention generally responds promptly to drug discontinuation (see PRECAUTIONS)

Hematologic:

Incidence less than 1%: leukopenia and decreases in hemoglobin and hematocrit

Causal relationship unknown: hemolytic anemia, thrombocytopenia, granulocytopenia, bleeding episodes (e.g. purpura, epistaxis, hematuria, menorrhagia).

Cardiovascular:

Incidence less than 1%: congestive heart failure in patients with marginal cardiac function, elevated blood pressure.

Causal relationship unknown: arrhythmias (sinus tachycardia, sinus bradycardia, palpitations).

Allergic

Incidence less than 1%: anaphylaxis (see CONTRAINDICATIONS).

Causal relationship unknown: fever, serum sickness, lupus erythematosus syndrome

Endocrine:

Causal relationship unknown: gynecomastia, hypoglycemic reaction

Renal:

Causal relationship unknown: decreased creatinine clearance, polyuria, azotemia.

Symptoms and Treatment of Overdosage: A nineteen month old child weighing 12 kg ingested from 2800 to 4000 mg of Motrin (ibuprofen) and presented with apnea, cyanosis and responded only to painful stimuli. Oxygen and parenteral fluids were given and at 12 hours she appeared completely recovered. Two other children (10 kg each) ingested 1200 mg of Motrin each and there were no signs of acute intoxication or late sequelae. A 19 year old male who had ingested 8000 mg of Motrin reported dizziness, and nystagmus was noted. He recovered with no reported sequelae after parenteral hydration and three days' bed rest

In cases of acute overdosage, the stomach should be emptied by vomiting or lavage, though little drug will likely be recovered if more than an hour has elapsed since ingestion. Because the drug is acidic and is excreted in the urine, it is theoretically beneficial to administer alkali and induce diuresis

Dosage and Administration: *Rheumatoid arthritis and osteoarthritis:* The initial daily dosage in adults is 1200 mg divided into 3 or 4 equal doses. Depending on the therapeutic response, the dose may be adjusted downward or upward. The daily dosage should not exceed 2400 mg.

Maintenance therapy, once maximum response is obtained, will range from 800 to 1200 mg per day.

Mild to moderate pain accompanied with inflammation, dysmenorrhea: 400 mg repeated as required every 4 to 6 hours. The daily dosage should not exceed 2400 mg.

Children: Due to the lack of clinical experience, ibuprofen is not indicated for use in children under 12 years of age.

Supplied: 200 mg (yellow), 300 mg (white), 400 mg (orange) sugar-coated tablets and 600 mg (peach) film-coated tablets in bottles of 100 and 1000

Product monograph available on request. CE 1542.1C

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Metastatic Disease and the Dentist

Philip Worthington, MD, BSc, FDSRCS
Seattle, Washington

ABSTRACT

The evolving role of the dentist in the diagnosis of disease beyond the confines of the mouth is observed, and changes in the patterns of disease are noted. It is important for the clinician to be aware of the many ways in which metastatic disease may present itself and it is suggested that this pathologic process has replaced syphilis as the "great imitator" in clinical medicine. Several examples are given of metastatic disease simulating dentally related conditions.

SOMMAIRE

Voici un article consacré au rôle de plus en plus considérable que le dentiste peut jouer dans le diagnostic des maladies dont le foyer se trouve en dehors de la cavité buccale ainsi que dans la notation des changements liés au développement de la maladie. Il est donc important que le clinicien connaisse les nombreuses façons dont les maladies métastatiques peuvent se manifester. On pense que ce processus pathologique a remplacé la syphilis en tant que "grand imitateur" en médecine clinique. L'article donne plusieurs exemples de maladies métastatiques se reflétant dans la cavité bucco-dentaire.

Over the last 50 years there have been significant changes both in the role of the dentist in the community and in the prevalent patterns of disease. With the increasing complexity of dental care and greater diversity in the dental school curriculum, the stature of the dental surgeon as a health-care provider has grown considerably. Regarded many years ago as a professional providing diagnosis and treatment for "the teeth", we have seen the dental surgeon progress through two further stages. As a result of a better understanding of periodontal and mucosal disease, the dental surgeon evolved into a diagnostician and provider of treatment for the oral cavity as a whole. Nowadays he is also an important clinician who, in addition to treating the teeth and their supporting structures, is trained to examine patients not only for signs of local pathologic changes in the mouth but also for signs of systemic disease manifested in the head and neck region. This role is necessarily based on broader training in pathology and greater experience in clinical medicine and surgery. By virtue of his position in the community, the dental surgeon can apply his diagnostic skills to screen many patients and in this regard, play a role distinct from, but complementary to, that of his medical counterpart. Since signs of serious head and neck disease may be relatively uncommon, the price of diagnostic success is constant vigilance. The other essential ingredient is an awareness of how disease processes can present themselves.

One of the many changes in the prevailing pattern of disease over the last 50 years has been the decline in the frequency of tertiary syphilis. At one time this disease was common and notorious not only for affecting all strata of society but also for the protean nature of its manifestations. Syphilis was justly described as "the great imitator" because the lesions would appear at literally any site, and signs and symptoms could assume an infinite variety of patterns closely mimicking other disease processes. Medical students were taught always to include syphilis in their differential diagnostic thought processes, particularly when clinical signs and symptoms did not seem to "fit". Sir William Osler advised: "Know syphilis in all its manifestations and relations and all other things clinical will be added unto you." On another occasion he said, "Syphilis simulates every other disease. It is the only disease necessary to know. One then becomes an expert dermatologist, an expert laryngologist, an expert alienist, an expert oculist, and expert diagnostician."

The purpose of this article is to draw attention to the very diverse manifestations of metastatic disease in the head and neck region and to suggest to the dental surgeon that in place of syphilis, metastatic disease — although less common than syphilis used to be — could nowadays be regarded as "the great imitator". A series of clinical examples will serve to illustrate how patients with metas-

Fig. 1. Case 1: Patient E.W., with facial paresis on right side.

Fig. 2. Case 2: Patient A.R., with swelling at lower border of mandible.

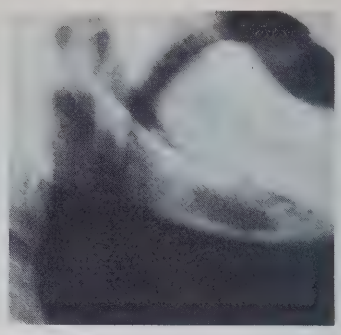

Fig. 3. Case 2: Radiograph of mandible with radiolucent lesion near lower border.

tatic disease of the head and neck can present themselves to their dental surgeon with complaints that simulate infections, jaw joint problems, prosthodontic disorders, sinus disease, and other dentally related conditions. The dentist should always bear in mind the possibility of metastatic disease, particularly when something in the clinical picture is a little unusual.

CASE 1 — METASTASIS SIMULATING TEMPOROMANDIBULAR JOINT DYSFUNCTION

E.W., a 65-year-old edentulous caucasian woman, had had her remaining teeth extracted by her family dentist one year previously. For financial reasons, she later chose to consult a denturist for the provision of complete upper and lower dentures. Shortly after the dentures were fitted she developed discomfort, sometimes amounting to pain, in the right preauricular region, with tenderness over the right temporomandibular joint. She endured this for three months before consulting her family physician who then referred her to an oral surgery clinic, with the not unreasonable question, "Is there something wrong with the dentures that is causing symptoms from the jaw joint"? Within a few days the patient developed facial weakness on the right side — a lower motor neuron type of facial paresis, together with a feeling of discomfort in the right anterior tongue (**Fig. 1**). The remaining cranial nerves and clinical examination showed no other abnormality. Since it is not uncommon for a Bell's palsy to be accompanied in the early stages by preauricular discomfort or pain, this might have been regarded as just part of the Bell's palsy picture.

During the course of clinical examination, however, some abnormal tissue was seen deep within the right external auditory meatus. On histologic examination this proved to be a metastatic deposit from a poorly differentiated adenocarcinoma. Review of the medical history revealed that this patient had had a mastectomy and radiation therapy five years previously for a carcinoma of the breast, with no abnormal findings on any of the subsequent follow-up examinations. Histologic examination of the primary tumour showed that the metastasis was of a similar type. There was no discernible radiologic change in the skull base or temporal bone. This then is an example of carcinoma of the breast metastasizing to the temporal bone, and presenting itself as a temporomandibular joint disorder. It was not unreasonable for the referring physician to link this provisionally with the recently constructed dentures. This case serves to underline the need to include examination of the ears in the work-up of a patient with a temporomandibular joint problem. Within a further three months, the patient developed epileptiform seizures due to cerebral metastases, and died.

CASE 2 — METASTASIS SIMULATING AN IMMEDIATE DENTURE PROBLEM

A. R., a 59-year-old caucasian man had had all his remaining teeth extracted and had been fitted with immediate upper and lower dentures. Four weeks later he complained of a tender swelling at the lower border of the left mandible, with local discomfort (**Fig. 2**). The swelling was attached to the lower border of the jaw but not to the overlying skin. His dentist asked whether these symptoms were causally related to the extractions and to the wearing of the immediate dentures. This patient was a somewhat garrulous man, and faced with such a patient the clinician could have been tempted to disregard his comments. We should, however, always follow Osler's sage advice: "*Listen* to the patient — he is telling you the diagnosis."

The history included some revealing comments. The patient said that while driving to the hospital he had felt "strange" for a moment — "like a wave passing over me" — and that, just for a moment, his hand had felt as if he did not know where the gear-shift lever was. This is a layman's description of astereognosis. It is significant and usually indicates disease of the cerebellum or posterior columns. This patient also had two swellings in the skin — one on his anterior chest wall and one on his scapular region, each a few centimeters in diameter. The mandibular radiograph showed a radiolucent lesion near the lower border (**Fig. 3**). The chest radiograph was clear. Biopsy specimens of the radiolucent jaw lesion and both thoracic wall swellings revealed metastatic squamous cell

Fig. 4. Case 3: Patient E.C., with widened left palpebral fissure and some fullness over the left zygomatic arch (arrowed).

Fig. 5. Case 3: Increasing proptosis and chemosis on left side.

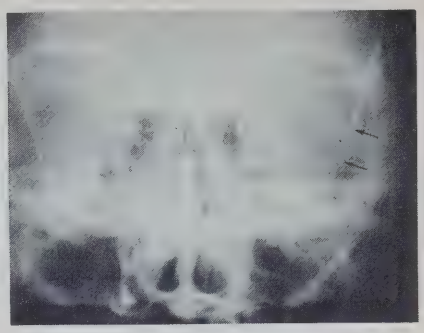

Fig. 6. Case 3: Skull radiograph showing erosion of linea innominata on left side (arrowed).

carcinoma. Although it was not possible to identify the site of the primary tumour the probability was that it came from the lung, despite the normal chest radiograph. In the course of several weeks, the patient developed further neurologic signs — weakness of abduction of the left arm, weakness of the small muscles of the left hand, and the flexors of the left hip, and right-sided ankle clonus. He finally developed epileptiform seizures and died.

CASE 3 — METASTASIS PRESENTING AS FACIAL PAIN AND PROPTOSIS

E.C., a 49-year-old white woman, had a 10-week history of vague, left-sided facial pain. Three root fragments remained in the otherwise edentulous jaws but no other immediately apparent cause for facial pain was found. The patient had had a convergent strabismus for years.

Initial clinical examination showed slight widening of the left palpebral fissure with mild proptosis (**Fig. 4**). The left temple showed slight fullness above the zygomatic arch. The signs were subtle at the beginning but significant.

During the next 10 days, the patient's proptosis and chemosis became marked (**Fig. 5**). A chest radiograph revealed a shadow in the left hilum, and on the skull radiograph the linea innominata was eroded (**Fig. 6**). The final diagnosis was established when the temporal swelling was explored and biopsied: it revealed an undifferentiated carcinoma of the oat-cell type. This patient had a carcinoma of the lung with metastatic deposits and died within two months.

CASE 4 — METASTASIS PRESENTING AS TOOTHACHE AND STRABISMUS

L.W., a 66-year-old causasian man, had had some routine dental treatment performed under local anaesthesia by his dentist. He later developed toothache-like pain at the point of the chin, and the question arose as to whether this was connected with his recent treatment.

Pain later developed in the lobe of the right ear and the right supraorbital region. The pain later disappeared, but the patient developed a right-sided facial weakness (**Fig. 7**), and almost immediately noted the onset of double vision due to a mild divergent strabismus, caused by slight weakness of the right abducent nerve (**Fig. 8**). Clinical examination revealed some diminution in touch sensation over the third division of the right fifth cranial nerve in addition to the right sixth cranial nerve paresis and the right facial palsy. A chest radiograph showed a lesion in the left lower lobe with a small effusion. This patient had a carcinoma of the left lower lobe bronchus with metastases involving his cranial nerves. He died within four months.

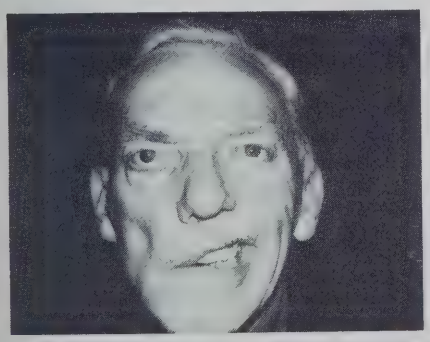

Fig. 7. Case 4: Patient L.W., with insipient right facial weakness. Not widening of the right palpebral fissure and deficient retraction or right oral commissure in attempting to "show the teeth".

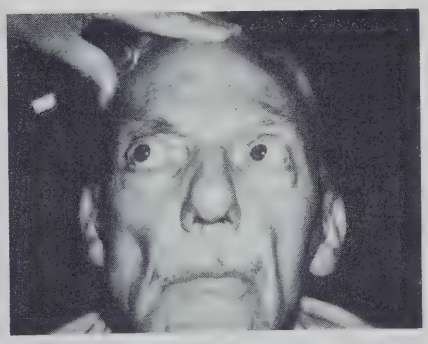

Fig. 8. Case 4: Attempted deviation of the eyes to the extreme right reveals a very slight but significant weakness of abduction of the right globe. This is due to abducens paresis.

Fig. 9. Case 5: Patient C.E.B., with radiolucent lesion of mandible and partial extrusion of tooth 4.7, due to metastatic malanoma.

CASE 5 — METASTASIS PRESENTING AS PERICORONITIS AND HYPESTHESIA OF THE LIP

C.E.B., a 30-year-old caucasian woman, complained of altered sensation in the right lower lip, which had begun four months previously. She described it as a mixture of discomfort and partial numbness. Swelling developed in the right lower molar region, and her dentist diagnosed pericoronitis at tooth 4.8 and removed this tooth after a preliminary course of antibiotics. Symptoms persisted, but despite careful examination by an oral surgeon and a neurologist, the true nature of her problem was not appreciated, the provisional diagnosis being multiple sclerosis. Radiographic examination of the right lower lip eventually revealed a radiolucent lesion (**Fig. 9**), which on biopsy proved to be a metastatic melanoma. This young woman had had a melanotic tumour removed from her chest wall four years previously, with no abnormal findings on subsequent follow-up examinations.

The development of lip paresthesia or anaesthesia, unexplained by trauma, is always a significant finding. Although infection is a likely cause, the possibility of neoplasia must be entertained until disproved. Early in the course of this patient's illness, partial extrusion of tooth 4.7 was noted (**Fig. 9**). In the absence of discharge from the gingival sulcus, extrusion of a tooth is also an important and suspicious sign.

DISCUSSION

Metastatic carcinoma is the commonest malignant disease of bone[1] Metastatic disease of the jaws is, however, not common. It is estimated that 1% of oral malignancies are metastatic lesions and that perhaps 1% of all tumours metastasize to the jaws.[2] However, the true incidence of metastatic disease is probably greater than realized[3] because the jaws are not always examined in detail at autopsy and the symptoms and signs of other metastatic lesions commonly overshadow those in the jaws.

The signs and symptoms associated with metastatic disease of the head and neck region commonly include the following:

- swelling (at any site)
- pain (which may be late in onset)
- sensory changes (paraesthesia or aneasthesia)
- visual changes (particularly binocular diplopia)
- epiphora
- discharge (from ear, nose, or pharynx)
- pathological fracture
- loosening or extrusion of teeth

From this list it is easy to see why metastatic disease is often misdiagnosed initially as inflammation. When something in the clinical picture seems "not quite right" the clinician must ask himself to re-examine *all* the evidence with great care. Is the swelling where it would be expected to be? Is the degree of loosening of a tooth or teeth explicable? If a tooth is extruded, would one not expect some discharge from the gingival sulcus? How about the radiologic findings? Is there adequate explanation for the onset of sensory change?

Besides mimicking infections, the differential diagnosis of metastatic disease includes: cysts, benign tumours, primary malignancies, and systemic disease affecting the bones, such as histiocytosis X.[4]

One must remember that the signs and symptoms of metastatic disease may well precede the discovery of the primary tumour by a year or more,[5] and, indeed, the primary may evade detection until autopsy. The literature is replete with examples of maxillofacial metastases proving to be the first clinical indication of recurrent disease,[6-8] and indeed the metastases may be the very first and only sign of disease.[9-11]

The clinical examples cited demonstrate that metastatic disease of the maxillofacial region may reveal itself in many forms, simulating a wide variety of dentally related conditions. It is important for a clinician to be alert to this possibility, especially when the clinical situation is unusual. Although the prognosis for these patients is poor, prompt diagnosis, appropriate referral and treatment by means of surgery, radiation, chemotherapy, or hormone therapy may alleviate pain, prolong life, and therefore prove worthwhile.

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Osteoradionecrosis of the Mandible: A Case Report

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ABSTRACT

Osteoradionecrosis of the mandible is a potential sequalae when radiation is delivered to the oral cavity. It is a disease of serious consequence which might result in severe functional disability and cosmetic deformity. Important factors in the dental management of these patients include the anticipated bone dose, pre-treatment dental status, dental hygiene, and retention of teeth that will be exposed to high dose irradiation. A case of osteoradionecrosis of the mandible has been reported, with resultant severe debilitation. Recent advances in radiation treatment for oral cancers, along with adequate shielding of the mandible and salivary glands, have substantially reduced the incidence of osteoradionecrosis.

SOMMAIRE

L'ostéoradionécrose de la mandibule est une complication qui peut surgir à la suite d'une radiographie de la cavité buccale. Il s'agit d'une maladie dont les conséquences sont sérieuses et qui peut entraîner une dysfonction grave ainsi que des difformités. Le traitement dentaire des patients atteints comprend plusieurs points importants dont la quantité d'os prévue, l'état de santé dentaire avant le traitement, l'hygiène dentaire et la rétention des dents qui seront exposées à des doses élevées d'irradiation. On a signalé un cas d'ostéoradionécrose de la mandibule ayant entraîné un affaiblissement sérieux. Les derniers progrès dans les traitements des cancers buccaux au moyen de radiations, alliés à l'utilisation d'un bon écran pour protéger la mandibule et les glandes salivaires, ont considérablement réduits l'incidence de l'ostéoradionécrose.

Radiation necrosis or osteoradionecrosis of the mandible is a potential sequela any time a substantial amount of irradiation is delivered to the oral cavity. The incidence of osteoradionecrosis has been declining over the past two decades,[1,2] as improved methods of irradiation and standards for dental evaluation and management have emerged.

A spectrum of changes occur in the mandible after exposure to radiation therapy, and may be divided into three categories: 1) osteoradio-atrophy; 2) aseptic osteoradionecrosis, and 3) septic osteoradionecrosis.

"Osteoradio-atrophy" is a term used to describe a bone that has been irradiated and demonstrates minimal radiographic changes. As long as the patients with osteoradio-atrophy remain tumor free, they remain asymptomatic from the standpoint of mandibular problems.

Aseptic osteoradionecrosis is a more advanced stage than osteoradio-atrophy in the spectrum of the altered physiological condition of the mandible due to irradiation. Aseptic osteoradionecrosis represents the stage in which portions of the mandible are no longer viable.

Septic osteoradionecrosis represents active infection within bone. Roentgenograms of septic osteoradionecrosis of the mandible demonstrates evidence of osteomelitis and necrosis.[3]

REVIEW

Tissue reactions in the oral cavity following therapeutic irradiation consists of mucositis as an acute reaction which can start with as little as 2000 rads.[5] When the major salivary glands are in the irradiated field, the common symptom is a dry mouth that becomes prominent as the therapy progresses. After about 1000 rads the saliva becomes viscous and adherent to the mucosa and teeth, losing its lubricating properties. This is due to the loss of serous secretory activity. The salivary glands become obstructed, with loss of acinar cells and atypical nuclei in acinar and duct cells.[4] The glands become non-functional and xerostomia results. Whenever the mandible must be in the irradiated volume, some special considerations are involved. Care must be taken to ensure that the radiation

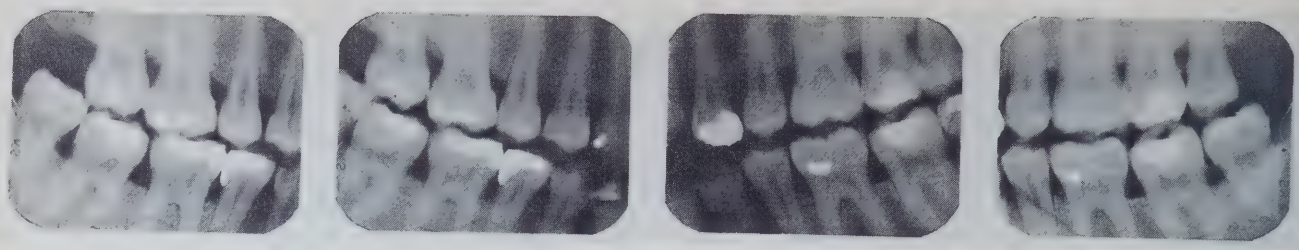

Fig. 1. Bite-wing radiographs (August 1969).

dose to the bone does not exceed the tolerance. If the patient is in excellent state of oral health the mandible will tolerate a dose of 6000 rads in 30 to 35 fractions over 6 to 7 weeks without exceeding tolerance in more than a small percentage of the patients treated.[5]

The initial changes in bone result from depletion of the osteocyte population. Osteoblasts tend to be more radiosensitive than osteoclasts so that after a course of radiotherapy there may be disproportionally greater lytic activity. With excessive depletion of the osteocyte population, regions of the bone become devitalized and degenerative changes begin to develop. These changes are potentiated because the same doses of radiation will injure the small blood vessels of the bone as well as the oral mucosa.[4]

CASE REPORT

M.S., a white 23-year-old woman, had a localized excision of a tumour in the right floor of the mouth in 1958. The genesis of this case of septic osteoradionecrosis started at this time. The diagnosis was adenoid cystic carcinoma of the right submandibular gland. When the patient was seen one month later, there was a small indurated area in the floor of the mouth just lateral to the right submandibular duct. This was resected intraorally and diagnosed as adenoid cystic carcinoma of the right submandibular gland incompletely removed. In 1960, the tumour recurred and a wide excision was carried out through an extraoral approach. In 1961, a wider excision of the area, combined with a right radical neck dissection, was undertaken to eradicate another recurrence of the tumour.

The patient was first seen by Dr. M.S. in his office August 1963. Her oral condition was excellent with only two class II and several class III restorations present. Her oral hygiene was good with some sub-gingival calculus evident; she was a heavy smoker. Between 1963 and 1969, in addition to routine scaling and prophylaxis, nine Class III restorations were placed or replaced. No posterior restorations were necessary (**Fig. 1**)

The patient was asymptomatic until August 1969 when she presented with a thickening at the base of the tongue within the mouth. A biopsy revealed adenoid cystic carcinoma. She was then treated with a course of radiation which was completed in September 1969. Her dentition was evaluted prior to the radiation and because of the low cariogenic activity, it was decided not to extract any teeth. She received between 7000-7500 rads to the base of the tongue including the mandible and salivary glands. Post-radiation response included: radiation mucositis, gingivitis and severe xerostomia. To stimulate salivary flow she retained candy and other sweet-flavored substances in the floor of the mouth. Her oral hygiene was severely compromised due to the discomfort in her mouth and her general oral condition deteriorated markedly.

Between November 1969 and August 1970, even though frequent fluoride treatments were given, and despite the best of periodontal care and treatment, her oral condition worsened with the need for seven class II and class V posterior restorations. In August 1970 the lower left first molar developed severe root caries with pulp involvement necessitating endodontic treatment. In December 1970, fluoride treatment was intensified a mouth-guard was fabricated to retain 1% fluoride gel which was to be applied at home. Poor cooperation, a painful mouth, the always present candy and heavy smoking, resulted in very rapid breakdown, with devastating results. By October 1973 the upper molars started to exfoliate. Periapical abscesses and severe periodontal disease were noted. (**Fig. 2**)

In June 1974 she developed an extra-oral fistula on the right side adjacent to the lower right molars beside the tongue. (**Fig. 3**) Two to three small openings under the right side of the mandible persisted and ingested fluids

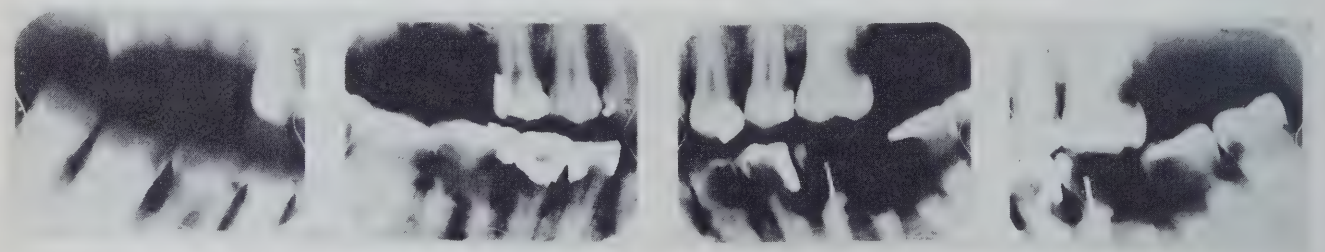

Fig. 2. Severe coronal destruction of teeth with continuing periodontal disease (July 1974).

would leak through, causing embarrassing eating problems. Extra-oral and intra-oral materials and bandages were used to prevent the leakage of saliva and fluids. Various obturators made of rubber and soft and hard acrylic were attempted, but failed.

By April 1975 all the crowns of the lower teeth and posterior upper teeth had disintegrated. The retained roots were infected. Under an umbrella of massive antibiotic coverage the remaining lower and upper posterior roots were extracted, an immediate complete lower denture and partial upper denture were fabricated, leaving the upper anterior teeth. An immediate complete upper denture was made in September 1976.

In 1978 a fistula developed on the left side. had repeated infections on both sides of the mandible which were treated with ampicillin when cultures revealed the presence of Escherichia Coli. The patient functioned adequately from 1976 to 1980, and required one remake of the lower denture in August 1980.

Osteoradionecrosis commenced in early 1973 due to the breakdown of teeth with subsequent abscess formation. The disease developed slowly and insidiously and by 1978 the total horizontal rami of the left and right mandible were involved, with multiple fistulae developing externally on the left and right sides. The tissue around the mouth became more and more inelastic and the patient's ability to open her mouth to accept food was limited. Tongue mobility was restricted and caused speech impairment.

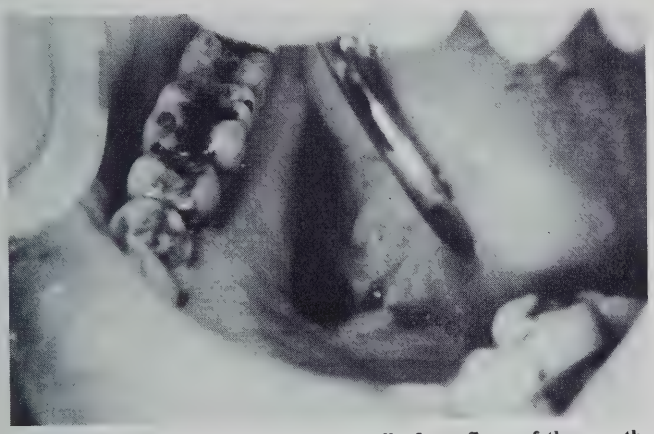

Fig. 3. Note fistula extending extra-orally from floor of the mouth, adjacent to the lower right molars (July 1974).

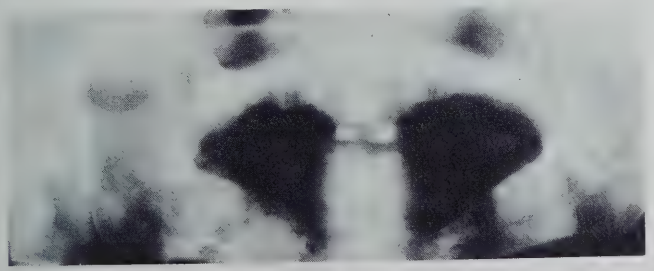

Fig. 4. Panoramic radiograph (December 1981), showing extensive osteoradionecrosis of mandible from angle to angle and pathologic fracture in lower left canine region.

Bone scans were taken in 1980 and 1981, which showed ever-increasing devascularization of the mandible from angle to angle and a pathologic fracture occurred in December 1981. (**Fig. 4**) A series of hyperbaric oxygen treatments was given to the patient prior to the pathologic fracture, from June 1981 to November 1981. However, at that point, the disease was so rampant and had involved so much of the mandible, that it was to no avail.

In February 1982 the patient was taken to the operating room and the mandible from left angle to right angle was resected. Attempts at reconstructive surgery failed due to lack of viable tissue and the presence of tumour. She is at present functioning with a maxillofacial prosthetic replacement for her chin.

DISCUSSION

The presence of carious teeth or any oral or systemic bacterial infection enormously increases the risk of mandibular osteonecrosis. This is further compounded by the functional loss of salivary gland tissue if these were in the radiated volume. Since radiation injury is more severe and recovery impaired in surgically traumatized tissue, extractions prior to initiation of therapy require surgical procedures to eliminate residual bone spicules, e.g. alveolectomy and alveoplasty. Dental management thus becomes an integral part of the therapy for cancer in the oral cavity.[6]

It was noted that the dental defects[7] occurred whether the teeth were inside or outside the field of radiation, and that the common factor in the development of caries was the inclusion of the major salivary glands. Radiation of the teeth and jaws without inclusion of the salivary glands reduces the normal salivary flow and lessens its protection of the teeth by cleansing, lubricating and antibacterial action. The pre-radiation condition of the teeth, the degree of dietary alteration, the severity of xerostomia and the ability to maintain oral hygiene, are important factors which determine the post-radiation integrity of the dentition and possible subsequent septic osteoradionecrosis of the mandible.[8] It is obvious that an early evaluation by the dental service is essential in the diagnostic workup of any patient with a suspected cancerous lesion of the head and neck. This becomes even more important with tumours in the vicinity of the mandible and/or when management includes surgery involving the mandible plus radiotherapy. All obviously carious teeth with periodontal infection should be extracted, while vigorous conservation could be practised with the salvageable teeth. These measures should be started in the pre-treatment period and continued during radiotherapy and indefinitely thereafter. If radiation doses above 7000 rads are to be given, then consideration of extraction may be necessary, due to the increased incidence of spontaneous and traumatic septic osteoradionecrosis.[2,9]

CONCLUSION

A case of septic osteoradionecrosis has been described. It is a disease of serious consequence which may result in severe functional disability and cosmetic deformity. The salient concern is the amount of radiation to the mandible. Factors important in the dental management of these patients include the anticipated bone loss, pretreatment dental status, dental hygiene and retention of teeth that will be exposed because of high-dose irradiation.[10] Extraction techniques and allowance of adequate healing time for teeth extracted before radiotherapy, must be defined. Suitable therapy in these instances would be to retain the tumorcidal dose of radiation with adequate shielding of the mandible, so that bone-related changes are minimal. The development of super voltage radiation for the treatment of oral cancer has effectively decreased the radiation dose absorbed by the mandible and thus the incidence of osteoradionecrosis.

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Sinus tracts of odontogenic origin in the face and neck

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SUMMARY

Infections of dental origin may cause serious problems such as ostemyelitis and cutaneous fistulas. A review of sixteen cases of sinus tracts in the skin of dental origin is presented. In seven instances the true nature of the lesion was not suspected. The difficulty in locating the dental origin of cutaneous sinus tracts is discussed, and the point is emphasized that negative findings on routine radiography may not exclude the presence of inflammation or other processes causing bone destruction, particularly in the maxilla.

SOMMAIRE

Les infections provenant des dents peuvent provoquer des maladies graves, tel que l'ostéomyélite et des fistules de la peau. Cet article présente seize cas de fistules de la peau provenant d'infections des dents. Dans sept de ces cas, l'étiologie dentaire de ces fistules ne fut pas suspect. La difficulté parfois d'identifier les dents infectées qui peuvent être la source de fistule cutanée est discutée. On souligne le point que des radiographies négatives n'exclus pas la possibilité de la présence de processus inflammatoire; ceci est surtout vrai au niveau du maxillaire supérieur.

Among the many conditions affecting the skin of the face and neck, very few arise directly from the teeth. Occasionally, however, odontogenic infections can extend to the skin surface. The purpose of this article is to describe some cases where periapical dental infections opened via a sinus tract on the skin of the face and neck.

While the majority of sinus tracts that arise from infected teeth open on the skin of the face, they can also open on the skin of the neck or even onto the chest. In seven of our cases, the fact that the cutaneous sinus tract had its origin in infected teeth was not recognized. It is understandable that the differential diagnosis of these lesions can be difficult, particularly when they appear at some distance from the mouth. They have previously been mistaken for localized skin infections, carbuncles, infected sebaceous cysts, dacrocystitis, traumatic lesions and even basal or squamous cell carcinomas. It is interesting to note that the histologic appearance of the epithelial lining of the sinus tract can somewhat resemble squamous cell carcinoma in appearance due to pseudo-epitheliomatous hyperplasia. This has led, in one instance, to a mistaken histopathologic diagnosis of carcinoma, with the resultant incorrect treatment of the lesion as a malignant tumour.[1]

REPORT OF CASES

The authors have seen 16 patients with sinus tracts in the skin of dental origin, between 1959 and 1979 (**Fig. 1, Table I**). Fifteen of the patients were caucasian and one black, ranging in age from 24 to 68 years. There were 7

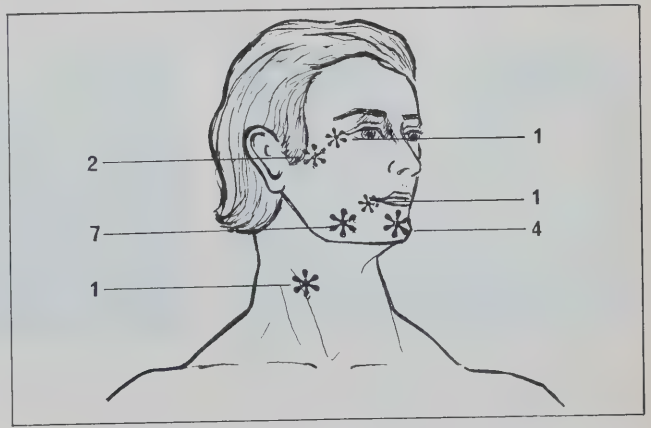

Fig. 1. Anatomical distribution of 16 cases of skin sinuses of dental origin. The numbers indicate total number of cases counted in the area.

TABLE I

Treatment and location of sinus tracts

	Case	Sex/Age	Initial Treatment	Cutaneous Area of Fistulae	Infection Originating from
Maxilla (4 cases)	1	F/29	Antibiotics, removal of the tooth	Outer canthus of eye	13
	2	M/60	3 excisions, radiotherapy	Supra-zygomatic area	26,27,28
	3	M/58	Antibiotics, 2 excisions	Temporal area	26
	4	M/31	Antibiotics 8 months	Anterior triangle of neck	18
Anterior Segment of Mandible (6 cases)	5	F/36	Excision, antibiotics	Chin	11
	6	F/32	Excision, antibiotics	Chin	32
	7	F/39	Removal of the tooth	Lower right lip	43 root-tip
	8	F/29	3 excisions of fistulas	Chin	41,31
	9	F/45	Removal of the tooth	Opposite body mandible	43
	10	F/23	Removal of the tooth	Chin	42
Posterior Segment of Mandible (6 cases)	11	F/44	Removal of the tooth	Opposite body mandible	46
	12	M/27	Removal of the tooth	Opposite body mandible	35
	13	M/37	Removal of the tooth	Opposite body mandible	47
	14	M/37	Removal of the tooth	Opposite body mandible	48
	15	F/53	Removal of the tooth	Opposite body mandible	36
	16	M/38	Removal of the tooth	Opposite body mandible	35

males and 9 females. In only one case was there an evident underlying medical problem; this patient (case 14) had diabetes mellitus which was controlled by medication.

In only one of the 16 cases did the patient complain of toothache when first seen. The lesions usually showed an intermittent serous or, on occasion, a sero-purulent exudate; only once was there a frank purulent discharge. One patient showed a sinus tract near the lateral canthus of the eye and two in the temporal area — one of which was directly superior to the zygomatic process of the maxillary bone and the second was located in a more superior posterior position in the pre-auricular hairline. One sinus tract occurred in the lower lip next to the commissure on the right side. Seven were located directly in the skin overlying the body of the mandible, and four cases were found on the chin. Finally, one patient presented with a sinus tract in the neck, located in the anterior triangle slightly inferior to the hyoid bone.

In seven cases, the etiology of the sinus tract was not recognized initially. In these cases the treatment prior to establishing the true nature of the disease varied from surgical excision to antibiotic therapy, for as long as 10 months, and in one case, a combination of repeated surgical excisions and low-dose radiotherapy.

Thirteen of the cases were seen initially by either a physician or a general or plastic surgeon; the remaining three cases were first examined by a dentist. When the sinus tract occurred in an area other than directly over the body

Fig. 2. (Case 3). Note the extensive scarring of the face following three attempted surgical excisions and low dose radiotherapy.

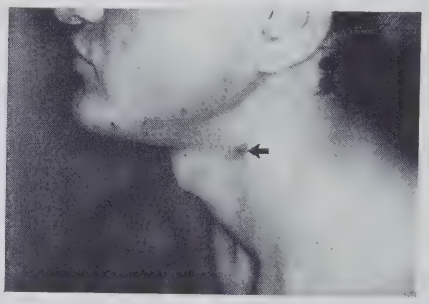

Fig. 3. (Case 4). Sinus opening in the neck, arising from an upper third molar tooth.

Fig. 4. (Case 8). Sinus opening in the skin from periapical infection of the lower centrals. The scar from three previous attempts at extraoral excision is evident.

of the mandible, it was generally treated at first with antibiotics and then with a localized excision. It was only after the cutaneous lesions recurred that the possibility of a dental etiology was considered. In two of the seven cases where the teeth were not initially suspected as the cause of the lesion, sinograms were done but with inconclusive results.

Case 2 was seen initially by his physician for what was considered to be a localized infection of the face (**Fig. 2**). The lesion was located in the left anterior suprazygomatic area. When it recurred after prolonged antibiotic therapy, he was referred to a general surgeon and the skin lesion and sinus tract were curetted. When the lesion recurred again after a few weeks, a second attempt at extraoral excision was made; this proved no more successful than the first attempts at treatment. A dental consultation was requested, and after clinical and radiologic examination of the jaws and teeth, it was reported that no dental focus of infection was present. A third cutaneous excision was then attempted. When the lesion recurred for the fourth time, low-dose radiation therapy was used but without success. At this stage a consultation was requested with the Division of Oral and Maxillofacial Surgery. A review of the previous dental radiographs and of more recent films showed no evidence of bone destruction in the maxilla. It was suggested that an exploratory procedure via an intraoral approach might be of diagnostic value in locating the source of the lesion. When the incision was made in the mucobuccal fold opposite the molar teeth and the flap reflected, it was evident that there was a large mass of granulomatous tissue around the molar teeth which had destroyed the buccal plate of bone and extended into the maxillary antrum. Because of this, the involved teeth and the granulation tissue were removed and the wound closed in the usual fashion. The cutaneous sinus tract healed shortly after and has not recurred.

In case 4, the patient presented with a persistent sinus tract of the neck (**Fig. 3**). He was initially treated with antibiotic therapy for a prolonged period; then two attempts at excision of the skin lesion were made. The dental radiographs showed no abnormality. An intraoral exploratory procedure revealed, as in the previous case, bone destruction from a periapical granuloma. Following removal of the granulation tissue and the involved tooth, the sinus tract healed.

Cases 5, 6 and 8 all had somewhat similar histories of sinus tracts treated with antibiotics and at least one extraoral surgical intervention. However, when roentgenograms of the teeth were taken, periapical radiolucent areas indicated infection (**Figs. 4, 5 and 6**).

DISCUSSION

The volume and thickness of the bone surrounding the teeth influence the involvement of dental infections that lead to openings in the skin. We have described elsewhere the development of osteomyelitis of the jaws in cases where the roots of infected teeth are surrounded by thick cortical bone.[2,3] However, when the cortical bone surrounding infected teeth is thin, an infection can easily spread into the soft tissues, causing a cellulitis and in some cases a sinus tract in the skin. In these circumstances, the position of the muscle insertions relative to the apices of the infected teeth play an important role in determining the anatomical area involved in the infection. The anatomical details of this relatinship have been described by several authors.[4,5]

The fact that dental infections can cause sinus tracts in the skin of the head and neck is well documented.[5-7] Such lesions always merit a dental consultation and roentgenographic examination of the teeth and jaws. However, it cannot be over-emphasized that a negative radiograph of the maxilla does not rule out an odontogenic etiology. This point is well illustrated in our series of cases. Initially, the teeth were not considered to be the cause of the lesions in the four cases arising from the upper molar teeth, even after numerous dental radiographs of the area had been taken.

It has been estimated that 30 per cent of the bone volume and up to 60 per cent of the mineral salts of a vertebra must disappear before roentgenographic evidence of this loss becomes evident.[8] The vertebrae are composed of a substantial outer layer of dense cortical bone with an inner core of spongy bone and marrow. The maxilla, however,

Fig. 5. (Case 11). Sinus opposite the body of the mandible caused by a periapical infection from the lower first molar tooth.

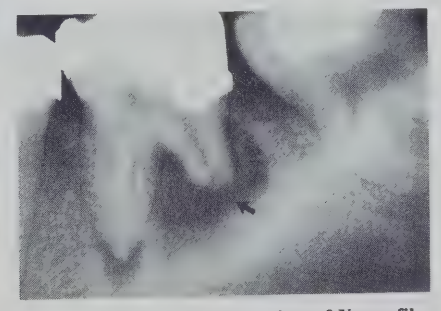

Fig. 6. (Case 11). Reproduction of X-ray film showing obvious periapical bone destruction (arrow).

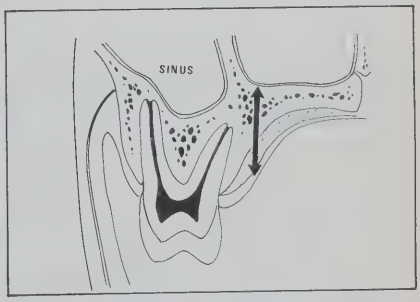

Fig. 7. The relationship between the teeth and the antrum and inner nose. Note the thinness of the bone over the periapical areas and the buccal roots. Sometimes the apices may be directly in the antrum, covered only by a thin mucous membrane.

has a more complicated architecture in the tooth-bearing areas.

Radiographs may not be diagnostic in the maxilla as the thin bony cortex of the maxilla, plus the superimposition of the normally air-containing and therefore radiotranslucent sinus and nasal cavities within the radiographic field of examination, combine to lower the average density of maxillary bone in X-ray films. This means that even when a considerable portion of the mineral salts has been lost from the maxilla, there may still not be sufficient reduction in local bone density to allow radiological diagnosis of demineralization. Furthermore, if the apices of the teeth lie in the floor of the antrum, there is little bone destroyed even when large granulomas are present. The same observation applies to the cortical plate covering the buccal roots of the upper molar and premolar teeth. The cortical bone in both these areas is frequently very thin, so that bone loss will not show on radiographs (**Fig. 7**).

The presence of radiolucent structures such as the antrum and the thinness of the cortical bone at the apices and over the buccal roots of the teeth, explain why the interpretation of radiographs in this region may be difficult. As a general rule when searching for infections in the posterior maxilla, the interpretation of X-rays should be treated with caution. This is particularly true if no indication of dental infection seems to be present on the radiographs, yet the clinical signs seem to indicate otherwise. This point is well illustrated in cases 2, 3 and 4, where even after large granulomas of the maxilla were exposed surgically, no radiological evidence of their presence could be seen on the pre- or post-operative radiographs.

Clinical symptoms such as pain are usually minimal in cases of sinus tracts of the skin arising from the teeth. This is because of the chronic nature of these infections. However, if the patient is questioned carefully, a history of dental pain prior to the appearance of the skin lesion may be elicited. The diagnosis can be established by taking a careful history to find out if the patient has had prior dental infections or tooth pain in the area. A thorough physical examination and vigorous palpation of the oral vestibule will, in some cases, reveal a firm, attached tissue in the area opposite the sinus tract and the causative teeth. This is due to the fibrous tissue and the inflammatory process around the sinus tract. Vitality tests of the teeth are indicated and good quality dental radiographs are necessary. We have found that occlusal radiographs will sometimes reveal radiolucent areas that are not apparent on the standard dental films. Finally, in cases where the results of the physical examination, the vitality test of the teeth and the radiographs are inconclusive, an intraoral exploratory procedure will frequently pinpoint the dental etiology of the skin lesion.

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Reprint requests to Dr. Donohue.

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Previously unpublished articles, critical reviews of material on advances in dentistry and clinical reports are welcomed by the Journal of the Canadian Dental Association for consideration for publication. Material is accepted by the Journal on the understanding it is submitted solely to this publication.

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Announcements/Avis

CANADA 1984

March/mars

Canadian Association of Oral and Maxillofacial Surgeons annual convention. March 14-20, 1984, Banff Alberta. Contact: Dr. R. E. Warren, Convention Chairman, #2 St. George's Crescent, Edmonton, Alberta, T5N 3M7. Phone 403-451-5884.

April/avril

Con-joint Convention of the Canadian Dental Association and Les Journées Dentaires du Québec, April 8-12, 1984, Palais du Congrès, Montréal, Que. Contact: Dr. Michel Jahjah, General Chairman, 3565 rue Berri, Bureau 200, Montréal, Que., H2L 4G3, 514-842-9112.

Canadian Academy of Restorative Dentistry annual meeting, Montreal, Quebec, April 6-7, 1984. Contact: Dr. Berl Mendel, #216-5757 Decelles Ave., Montreal, Que., H3S 2C3. 514-342-2549.

May/mai

Ontario Dental Association 117th Annual Spring Meeting, Toronto, Ontario, May 13-16 1984. The Sheraton Centre. Contact: Mrs. A. M. Durham, 234 St. George St., Toronto, Ont. M5R 2P1, 416-922-3900.

Port Arthur Collegiate 75th Anniversary Reunion, Thunder Bay, Ontario., May 18-20, 1984. Contact: Registration Committee, F.A.C.I., 401 Red River Rd., Thunder Bay Ont., P7B 1B4.

June/juin

XIII Biennial Conference on Dental Research and Education. University of Manitoba, Winnipeg, Manitoba. June 10-16, 1984. Contact: The Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave. Winnipeg Manitoba.

July/juillet

Ninth Annual Congress of Dietetics. Toronto Ontario, July 1-6, 1984. Hilton Harbour Castle Hotel. Topics covered will be varied. Continuing Education credits will be assessed for ADA and CDA registered dieticians. Contact: Congress Canada, Suite 603, 250 University Ave. Toronto, Ont. 416-591-1498.

September/septembre

The Canadian Academy of Endodontics Twentieth Annual Meeting, Chateau Lake Louise, Lake Louise Alberta, September 14-16, 1984. Contact: Dr. Carl Hawrish, 762-10830 Jasper Ave., Edmonton, Alta., T5J 2B3, 403-425-8930.

International 1984

January/janvier

Bone-remodelling seminar by Dr. Leon Kussick, Honolulu, Hawaii, January 6-7, 1984. Contact: Carmen Education Seminars, P. O. Box 312, Abbotsford, B.C., V2S 4N8. Telephone 604-859-1855.

The Centre of Pediatric Dentistry is organizing the "Second Dominican Congress of Pediatric Dentistry" in Santo Domingo, January 27-29 1984. Congress themes are Prevention and Clinical Aspects. Fees are $50 U.S. Contact: Dr. Franklin Garcia-Godoy, Centre de Odontologie Pediatrica, P.O. Box 2753 Santo Domingo, Dominican Republic, Telephone 809-689-4277 afternoons and evenings.

International Dental Seminars announces the 10th International Alpine Dental Conference, Hotel Annapurna, Courchevel 1850, France, January 14-28, 1984. Contact: International Dental Seminars, 24 Cadogan Square, London SWIX 0JP England.

February/février

Miami Winter Meeting, Fontainebleu Hilton, Miami Beach Florida, February 2-4 1984. This is a program for international clinicians. Contact: the East Coast District Dental Society, 420 S. Dixie Highway, Suite 2-E, Coral Gables, Florida, 33146. 305-667-3647.

American Academy of Occlusodontia will hold its 28th annual meeting at the Essex Inn, Chicago Illinois, Feb. 18, 1984. Featured speaker will be Dr. H.T. Shillingburg. Contact: Dr. Jefferson Brock, 9631 Gross Point Rd., Skokie, Illinois, 60076.

Midwest Society of Periodontology 27th Annual Meeting, Hyatt Regency Chicago, Chicago Illinois, Feb. 18-19, 1984. Featured speakers are Drs. Mick Dragoo and Edwin Zinman. Contact: Midwest Society of Periodontology, 1223 East Plate Dr., Palatine Illinois, 60067, 312-358-4710.

Chicago Dental Society, 119th Midwinter Meeting, Chicago, Ill. February 19-22, 1984. Conrad Hilton Hotel. Contact: Chicago Dental Society, 30 North Michigan Ave. Chicago Ill. 60602, 312-726-4076 for information.

The sixth in a series of Arab health exhibitions, "Arab Health '84, will be held at the Jeddah Expo Centre, Jeddah, Saudi Arabia, February 19-23, 1984. Contact either: Virginia Kern, Fairs and Exhibitions Ltd., 51 Doughty Street, London, WC1N 2Lb, England, Tel: 01-831-8981 or Al-Harithy Company for Exhibitions Ltd., P.O. Box 6249 Jeddah, Saudi Arabia, Tel: 6658194/5.

March/mars

La Commission d'Études Biomatériaux créée par le Centre Français de la Corrosion (Cefracor) organise à Strasbourg Germany au Palais de Conseil de l'Europe sur le thème "Corrosion et dégradation des biomatériaux et leurs incidences cliniques." les 5-7 Mars 1984. Pour tous renseignements s'adresser au Secrétariat du CEFRACOR, 28 rue Saint Dominique 75 07 PARIS. Tél: 705.10.73 ou 705.39.26.

The First International Congress on dentistry, medical law and ethics will be held in Sedom, Dead Sea, Israel, March 13-18 1984. Contact: Dr. S. Perlmutter, Chairman, Organizing Committee, First International Congress on Dentistry, Medical Law and Ethics, P.O. Box 394, Tel Aviv 61003 Israel.

Dental Horizons Inc. will be giving a seminar entitled "Effective Practice Management Techniques: The Ideal Practice" at New York University, March 16 and March 23 1984. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bonx, New York, 10468, 212-933-5510.

International Dental Seminars announces the 11th International Alpine Dental Conference, Hotel Annapurna, Courchevel 1850, France. March 17-24, 1984. Contact: International Dental Seminars, 24 Cadogan Square, London SWIX 0JP England.

Advanced Paedodontics Course 338, The British Council, London/Newcastle Upon Tyne, March 18-30, 1984. Contact: The British Council, c/o The British High Commission, 80 Elgin St., Ottawa, Ont. K1P 5K7.

April/avril

Dental Horizons Inc will be presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice" Paradise Island, The Bahamas, April 4-8, 1984. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, New York, 10468, 212-933-5510 for information.

The American Association of Dental Consultants fifth annual spring workshop, Windsor, Ontario, Hilton International, April 28-29, 1984. Contact: Dr. Ed. Mazak, c/o Green Shield, 285 Giles Blvd. E., P.O. Box 1606, Windsor, Ont., N9A 6W1, 519- 255-1133.

May/mai

La Société Française de Parodontologie will hold VIIIemes Journées Françaises Internationales de Parodontologie, Arles, France, le 5-7 mai, 1984. Renseignement: Société Française de Parodontologie, 57 rue Amsterdam 75008 Paris, France.

June/juin

International Association of Oral Pathologists general meeting, to be held in Noordwijkerhout, the Netherlands, June 4-7 1984. Contact: Congress Secretaria, 2nd Meeting of the International Association of Oral Pathologists, c/o Mrs. R. Mooijen, AZVU Pathologisch Instituut, De Boelelaan 1117, MB Amsterdam, the Netherlands.

Dental Horizons Inc. are presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice" Einstein, New York, June 8, 1984. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, New York, 10468, 212-933-5510.

104th Annual Meeting of the British Dental Association, in association with the 3rd International Quintessence Symposium and the 2nd International Symposium on ceramics. Barbican Centre, London, June 14-17, 1984. Contact: The British Dental Association, 64 Wimpole St. London, England, W1M 8AL.

The International Congress of Oral Implantologists World Congress VII for Oral Implantology, Munich, West Germany, June 21-24, 1984. Munich Sheraton Hotel. Contact: Clifford J. Kirschner, Executive Director, The International Congress of Oral Implantologists, P.O. Box 2277, Grand Central Station, New York, NY. 10163, 201-783-6300.

Florida Dental Association 1984 Florida Dental Congress, Buena Vista Palace, Lake Buena Vista, Orlando, Florida, June 23-25, 1984. Contact: Florida Dental Association, 3021 Swann Ave. Tampa Fla. 33609, 813-877-7597.

The Sixth International Conference on Periodontal Research, Kibbutz Shefayim, Israel, June 19-22, 1984. Contact: The Sixth International Conference on Periodontal Research, P. O. Box 394, Tel Aviv, 61003, Israel.

August/août

The New Zealand Dental Association is holding its biennial conference, Auckland New Zealand, August 12-17 1984. Contact: Dr. N. P. Ewart, Conference Secretary, P.O. Box 28085 Auckland 5, New Zealand.

72nd Annual World Dental Congress of the FDI, Helsinki, Finland, August 25-31, 1984. Contact FDI '84, Hallitusk 8, SF 00100, Helsinki 10, Finland.

September/septembre

McKay sub-branch of the Australian Dental Association will be hosting the North Queensland Dental Convention on Hayman Island, September 9-15, 1984. Contact: The Secretary, North Queensland Dental Convention, P.O. Box 838, Mackay 4740, Australia.

October/octobre

1984 American Equilibration Society Satellite Program, Acapulco Mexico, Hyatt Regency Hotel, October 1-3, 1984. For more information contact: the American Equilibration Society, 8726 North Ferris Ave, Morton Grove, Ill., 60053, 312-965-2888.

Eighth International Congress of Dental Technicians, Cologne, Germany, October 4-5, 1984. Congress-Centrum Ost of the Cologne Trade Fair Complex. Contact: Messe-und Ausstellungs Ges m.b.h. Koln, Messeplatz, Postfach 210760, D-5000, Koln, 21, Deutz.

Dental Horizons Inc is presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice" Bronx New York, Oct. 28, 1984. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, New York, 10468, 212-933-5510.

November/novembre

11th Asian Pacific Dental Congress, Excelsior Hotel, Hong Kong, November 5-10 1984. Contact: Congress Secretariat, International Conference Consultants, 57, Wyndham St. 1st Floor, Central, Hong Kong.

1985+

Second International Conference "Clinical Factors and Mechanisms Influencing Bone Growth", University of California, Los Angeles, January 1985. Abstracts submitted no later than June 30, 1984. Contact: Andrew Dixon or Bernard Sarnat, Dental Research Institute, School of Dentistry, School of Medicine, Centre for Health Sciences, University of California, Los Angeles, (UCLA), Los Angeles, California, 90024.

Canadian Academy of Restorative Dentistry, annual meeting, Ottawa, Ontario, September 27-28, 1985. Contact: Dr. Ed. J. Abrahams, #322-267 O'Connor St., Ottawa Ont., K2P 1V3, 613-236-1671.

Canadian Dental Association 1985 National Convention/l'Association dentaire canadienne, congrés national 1985, Ottawa Ontario, September 29-October 2, 1985.

Scandinavia's largest international trade fair, "Swedental "84" will be held in Stockholm Sweden, November 14-16 1984. Contact Stursberg/Hewitt/ Radley, U.S. Representatives, 6671 Sunset Blvd. Suite 1525, Los Angeles California. 90028, 213-462-6260.

The Indian Dental Association is presenting its 39th annual conference, Bombay India, last week of December 1984. Contact: Dr. L. K. Ghandi, Conference Secretary, 39th IDA Conference, C-56 N.D.S.E. Part-II, New Delhi, 110049.

The 24th Australian Dental Congress will be held in Brisbane Australia May 12-17 1985. The Congress is hosted by the Australian Dental Association. Contact: The Congress Secretariat, P.O. Box 29, Parkville, Vic. Australia, 3052.

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ONTARIO — Ottawa. Oral Maxillofacial surgery associateship available leading to early partnership. Long established, high gross, quality practice. Please reply to: Associateship, 526 Buchanan Crescent, Ottawa, Ontario, K1J 7V4 or call after 6 pm 613-746-3705.

QUEBEC — Montreal. Associate required. Fully equipped modern dental office available in Cote des Neiges area. Why invest thousands of dollars in an office when this excellent opportunity is available? Reply to CDA Box No. 2201.

NEWFOUNDLAND — Gander. Dentist with busy general practice, high volume patient flow and a large recall program, requires an associate with the view to full partnership. Excellent opportunities for all aspects of dentistry — crown and bridge, endodontics, paedodontics, etc. This practice is located in a medical arts building with a family physician group practice. Gander is a modern town of 12,000 and has an outside drawing population of 35,000. It has an international airport, hospital, arts and culture centre, recreational facilities etc. Interested parties please contact: Dr. R.A. Janes, P.O. Box 78, Gander, Nfld. A1V 1W5 (709) 256-3889 or 256-8473.

Opportunities Available

ALBERTA — Hygienist required. Dental clinic located in community of 8,000 population one hour away from Edmonton, Alberta, requires permanent full-time dental hygienist. Excellent atmosphere and renumeration. Reply: Hygienist P.O. Box 4006, Edmonton Alberta, T6E 4S8.

ALBERTA — CALGARY. Orthodontist. To establish a private practice in a shared office space with a well established pedodontist. Please reply in confidence: Dr. L. Smith, #401 320 23 Ave. S.W., Calgary, Alta., T2S 0J2, Canada.

QUEBEC — Two dentists requested for Hudson Bay. Working place: 1. Kuujjuaraapik (Poste de la Baleine); 2. Povungnituk. Population to serve: Inuit living in 6 villages, 3,500 persons), portable equipment available to work in smaller villages. Conditions: Renumeration: salary, one-year contract, bilingualism is essential, supplementary benefits (transportation, northern premium housing provided, etc.) Please send your curriculum vitae to: Projet Nord, DSC-CHUL, 2-700 Boul Laurier, Tour Frontenac, Suite 400, Ste-Foy, Que., G1V 2L8, (418) 659-4900.

Opportunities Wanted

QUEBEC — Montreal. Young, concientious dentist, McGill graduate with one year hospital internship, wishes to buy busy family oriented preventive practice or seeks affiliation with dentist planning semi or permenant retirement. Have strong preference for Montreal. Would consider Ottawa or Toronto. Reply CDA Box No. 2200.

Miscellaneous

WANTED: Volume 4, Canadian Journal of Dental Science, published circa 1871, Hamilton, Ontario. Please reply to CDA Box No. 2202.

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The Division of Orthodontics has a full-time tenure track position available July 1, 1984.

Responsibilities:

- Teach Undergraduate Orthodontics
- Private Practice Privileges
- Continuing Education
- Research — half time

Qualifications:

- Eligibility for Licensure in Nova Scotia
- Research Program
- Practice Experience
- Teaching Experience
- Continuing Education Experience

Deadline:

January 31, 1984 — Curriculum Vitae and References to:

Dr. W.B. Barro, Head, Division of Orthodontics, Faculty of Dentistry, Dalhousie University, Halifax, Nova Scotia, B3H 3J5, 902-424-2295.

Dalhousie University is an equal opportunity employer. Salary and rank commensurate with experience and qualifications.

In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents.

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Applications or nominations are invited to fill the position of Director of the School of Dental Hygiene in the Faculty of Dentistry, University of Manitoba for a term of three years, commencing July 1, 1984. In addition, this appointment carries with it a probationary appointment in the School of Dental Hygiene. Both women and men are encouraged to apply. In accordance with Canadian immigration requirements; this advertisement is directed to Canadian citizens and permanent residents.

Applicants should have a minimum of a Master's Degree and experience in dental hygiene education. Experience in academic administration would be an asset.

Responsibilities will include overall administration of the School of Dental Hygiene, curriculum development, staff appointments, coordination of staff development, student counselling, supervision of research activities within the School, participation on School, Faculty or University committees. Salary and academic rank commensurate with qualifications and experience.

Nominations or applications with current curriculum vitae and the names of three references should be submitted prior to **January 31, 1984** to:

Dr. A. Schwartz, Dean, Faculty of Dentistry
University of Manitoba, 780 Bannatyne Avenue
Winnipeg, Manitoba R3E 0W3

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ADVERTISING INDEX

Air Canada	34,84
Allan's Travel Service Ltd.	44
Ash Temple Ltd.	43
CDSPI	16, 44, 68, 87
Cooper Laboratories Ltd.	IBC, OBC
Den Mat Corporation	1
Dupont Canada	53
East West Travel and Tour Corp	66
Equion Securities	56
Floss Wand	102
King Saud University	98
Kodak Canada	8
McNeil Consumer Products	IFC, 67
Management Magic Ltd.	37
Procter and Gamble Inc.	2
Rhone-Poulenc Pharma.	9, 56
Upjohn Co. of Canada	7, 90
Toronto Professional Directory	55
SS White Penwalt	18
Windy Balloons	62

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Classified advertising has the most positive and far-reaching effect of any form of advertising you can use. **IF YOU USE—The Journal** of the Canadian Dental Association.

It reaches the profession in the most complete manner possible. Every dental practitioner, dental student, dental academic, dental library and dental faculty in Canada — and many abroad — receive our publication. More than 15,000 readers monthly.

The **CDA Journal** is a respected professional publication with extensive news of activities in the profession from across Canada and around the world. Scientific papers and reports of considerable significance in dentistry, written by nationally and internationally recognized specialists and researchers, appear first in the **Journal**.

The **Journal** deserves your complete confidence, because it can do the best job for you. Whatever you wish to advertise — a career opportunity, a practice for sale, an associateship available, dental equipment or office space, the Journal is the place to come. Why settle for less than the most effective vehicle for your classified message the next time the occasion arises?

Our classified rates are reasonable, the confidentiality of a CDA Box Number is available. Whatever your needs, the **CDA Journal** can do it for you.

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Hand crafted.

BY YOU AND ORAL-B® PERMITE™ AMALGAM.

The best materials. The most skillful hands. Brought together for exceptional results. In art. Or in the art of your restorations.

Oral-B presents Permite: The amalgam skilled hands truly appreciate.

Its excellent working and handling characteristics simplify packing and carving. Its high early strength and snap set cut the chair time required for superlative work.

Permite controls the Gamma 2 (tin-mercury) phase to give you a non-brittle, high-quality restoration. A tight marginal seal is achieved because Permite expands slightly as it sets. And the low static creep indicates its lasting marginal integrity.

Ask your Dealer for a trial supply of disposable capsules in your choice of setting speeds.

Powder or tablets, too.

Oral-B Permite amalgam and your skilled hands. Create a lasting restoration.

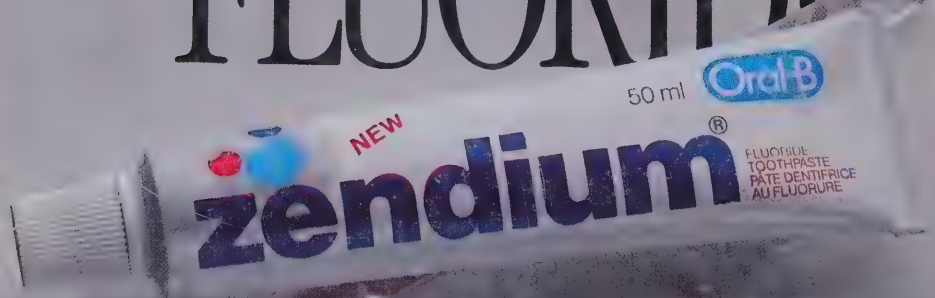
For more information contact your Cooper representative.

Oral-B®

Cooper Laboratories Limited
Mississauga, Ontario

OCT 2 2 1984
FEB 1 2 1985

THE BIGGEST BREAKTHROUGH IN TOOTHPASTE SINCE FLUORIDE



Now there's a toothpaste that contains a unique dual enzyme cleaning system that helps prevent deposit build-up.

This new toothpaste is called Oral-B® Zendium.®

How effective is it? Preliminary clinical tests* indicate that patients using new Oral-B Zendium toothpaste averaged lower levels of deposit build-up.

That means your patients can maintain the cleaning you perform in your office for a longer period of time.

For added protection, new Oral-B Zendium also contains sodium fluoride.

So, in effect, it's just about everything a toothpaste could ever be.

Make new Oral-B Zendium part of your preventative dentistry program. Recommend it to your patients.

For more information, contact your Oral-B representative.

Data available from Cooper Laboratories Ltd. upon request.

NEW ORAL-B ZENDIUM. THE TOOTHPASTE THAT HELPS PREVENT DEPOSIT BUILD-UP.

February/février 1984 Vol. 50 No. 2

JOURNAL

Canadian Dental Association

de l'Association Dentaire Canadienne

Public Health
Santé publique

Convention – Part II
Congrès (2ième partie)

If Undeliverable to Addressee
RETURN TO SENDER
Return Postage Guaranteed

Si non livrable au destinataire
RETOURNER À L'EXPÉDITEUR
Port payé

Crest helps reverse the caries process... even after it's started.

Until recently, it was widely accepted that the caries process was irreversible and that fluoride worked mainly by reducing the solubility of surface enamel. But, in the past few years, researchers have brought a new understanding of caries formation and the ways in which fluorides work.

Experts have come to view the decay process as an imbalance in the natural dynamics of demineralization and remineralization going on in the tooth. An area of subsurface decalcification, or white spot, first signals that demineralization is outpacing remineralization, and that the decay process is underway.[1,2] Research has shown that when free fluoride ions are introduced to the white spot area, remineralization can be accelerated–and the decay process actually reversed.[1,2,3]

Now, research has demonstrated that Crest's Fluoristat–which delivers the highest level of free fluoride in Crest's history[4]–penetrates tooth enamel and concentrates its fluoride in the decalcified white spot areas,[5] where it can hasten remineralization.

This begins to explain how Crest can help reverse the critical early stages of the caries process . . . even after it has started.

CREST
Concentrates its power on the weak spots.

CANADIAN DENTAL ASSOCIATION · RECOGNIZED ·

"Crest contains sodium fluoride which is, in our opinion, an effective decay preventive agent, and is of significant value when used in a conscientiously applied program of oral hygiene and regular professional care."
CANADIAN DENTAL ASSOCIATION

References: 1. Ostrom, C.A. et al., J Dent Res, 56(3):212-221, 1977. 2. Arends, J., ten Cate, J.M., J Cryst Gro, 53:135-147, 1981. 3. Silverstone, L.M., Caries Res, 11 (Suppl. 1):59-84, 1977. 4. Data on file at Procter & Gamble, Inc. 5. Mobley, M.J., J Dent Res, 60(12):1943-1948, 1981. For further information, please contact Crest Professional Services, P.O. Box 355, Station A, Toronto, Ontario M5W 1C5

February/février 1984 Vol. 50 No. 2

JOURNAL

Canadian Dental Association
de l'Association Dentaire Canadienne

EDITORIAL 110

CDA's Director of Accreditation discusses implications of the federal government's proposed Canada Health Act for the dental profession.

NEWS UPDATE 111

April in Montreal – Registration and hotel forms for the CDA-ODQ Convention in Montreal, April 8-12 and a capsulized account of events.

FDI WORLD CONGRESS 112

Participation by Canadian dentists at the 71st Annual World Dental Congress in Tokyo and the naming of Dr. William Thompson as a member of the FDI Council.
CDA appoints a committee on salaried dentists.
National Dental Health Month campaign material has been prepared.

BRIEFLY 117

Dental news items from across Canada and around the world.

LETTERS 121

CDA RESOURCE CENTRE 123

A list of articles available from the Resource Centre/Library on the subject of Third Molar Extractions.

BOOK REVIEWS 126

Changed Human Behaviour – Strategies for Preventive Dentistry
The Physiology of Oral Reconstruction
Atlas of Oral Pathology

ARTICLES

FORENSIC DENTISTRY REPORT 129
Preservation and Fixation of Skin for Ulterior Scientific Evaluation and Courtroom Presentation
Robert B.J. Dorion,

B.C. GUIDELINES FOR ASSOCIATESHIPS 133

THE MOBILE DENTAL CLINIC FOR THE DISABLED, FACULTY OF DENTISTRY, UNIVERSITY OF TORONTO 139
Norman Levine, DDS, Dip Paedo, MScD, FRCD (C). et al

A SURVEY OF DENTAL KNOWLEDGE, ATTITUDES AND BEHAVIOUR OF EXPECTANT PARENTS 145
A. John Lee, DDS, MPH

SCIENTIFIC

SYMPOSIUM 25

Fifteen dental researchers of international reputation presented status papers on their disciplines at this symposium in Winnipeg, that marked the 25th Anniversary of the establishment of the Faculty of Dentistry of the University of Manitoba. The Journal will publish all 15 in the next few editions. The first three of the series appear in this edition.

FUTURE POSSIBILITIES FOR INCREASED TOOTH RESISTANCE TO DENTAL CARIES 149
J.A. Weatherall et al

THE SIGNIFICANCE OF REMINERALIZATION IN CARIES PREVENTION 157
Leon M. Silverstone

POSSIBILITIES FOR MODIFYING THE CARIES ATTACK BY ALTERING THE ORAL MICROFLORA 169
G. W. Bowden

RRSP 118

OBITUARIES 122

ANNOUNCEMENTS 174

MARKETPLACE 176

ADVERTISERS' INDEX 177

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Notice of change of address should be received before the 10th of the month, to become effective the following month.

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All statements of opinion and supposed fact are published on the authority of the author who submits them and do not necessarily express the views of the Canadian Dental Association, unless such statements or opinions have been adopted by the Association. The editor reserves the right to edit all copy submitted to the Journal.

ISSN0709 8936

THE CANADA HEALTH ACT:

A SONG FORCED ON THE SINGERS

Now Monique set out to save Medicare
From the doctors so unfair:
"We'll pay what we like, they can all go hike
For we just can't afford health care . . . . .
I've now found a way to cover their pay
With full credit for us to share –
They can't charge a fee unless we agree
It's so easy our way, Pierre!"

Anyone who knows the tune of "Brady the Ulsterman" (will ye no come with me Johnny) can try singing the above verse with the hope that it might make the message it contains more attractive. The Canada Health Act has been introduced in the House of Commons and if approved, will financially penalize provinces which permit what Health Minister Monique Begin defines as "extra-billing by physicians". "Extra-billing" in reality is the difference between the value a physician places on his or her services and what the medicare insurance system is willing to pay. Under the provisions of the new Act, provinces will lose 1$ of Federal funds in support of medicare for every dollar patients must pay in "extra-billing" and in hospital user fees. ***Preserving Universal Medicare***, a Government of Canada position paper, puts it this way:

Medicare is being eroded by the spread of direct charges in the form of user charges and extra-billing. Existing legislation is not adequate to deal with the problem because it does not clearly tell the provinces, health care providers and the public that direct charges for health services will not be supported. It is time for a new Canada Health Act.

As I begin my duties with the senior secretariat of the Canadian Dental Association after serving for a number of years with the Canadian Medical Association, I hope I may be forgiven for beginning an editorial aimed at the dental profession with a description of a critical issue facing your physician colleagues. It is an issue, however, that the dental profession inevitably faces. If large numbers of dentists accept "assignment" of payment to third party insurers, they will be paving the way for the erosion of the distinction between the value the profession sets on its services and what an insurer (or the government) is willing to pay. The loss of this distinction is tantamount to a loss of independence, as the health professional becomes, in many ways, an employee (albeit an employee who does not receive paid vacations, pensions and other benefits).

Physicians, like Dentists, believe that insurance coverage of required health services is an excellent concept that extends the availability of care. Many have enjoyed the convenience of simplified billing and payment often provided. They have attempted to preserve important principles such as the patient's right to choose the practitioner and the practitioner's right to choose the patient, as well as the practitioner's direction of patient care. They have learned by experience, however, that assignment, even if it appears simply to be a routine "instruction to the patient's carrier to forward any benefits directly to the dentist" is the first verse of a new song they may now be forced to sing in unison. Fresh from my previous responsibilities, I have the urgent impression that the dental profession must place renewed emphasis on discouraging the acceptance of assignment or look forward to choir practice a little way down the road.

Brian J. Henderson,
CDA Director of Accreditation

CDA REPRESENTS SALARIED DENTISTS

*by Heather Lang-Runtz**

The Canadian Dental Association has been accused of neglecting the interests of salaried dentists. But, thanks to recent support for the establishment of a committee which would represent the interests of this special group, this accusation no longer holds.

Following numerous meetings over the last two years — and on the recommendation of the Executive Council — the CDA Board of Governors agreed at the September, 1983, annual convention to support the organization of the Standing Committee of Salaried Dentists. Brig.-Gen. J.N. Wright, representing federal salaried dentists, was appointed chairman by CDA President Robert Hicks. The committee will report at least once a year to the CDA Executive Council. Although there had been some discussion that such an organization should be independent of the national body, the general concensus was that another national group was both unnecessary and would contribute to the proliferation of dental organization in Canada.

The Standing Committee will act as a focal point for the concerns of all salaried dentists and "will, ultimately, direct those concerns to the CDA," said Gen. Wright.

For the moment, concerns topping the list include: inequities existing in the Income Tax Act between salaried dentists and self-employed dentists, who enjoy considerable taxation benefits; portability and retention of provincial licences for salaried dentists who relocate to another province; insurance and investment programs; the benefits of CDA membership for salaried dentists; and the need for more pertinent material that would interest this group in the **CDA Journal**. It was also recommended that the CDA should gather information on the salary scales of the various salaried dental groups in Canada every year, with the intent that this information be disseminated to the groups who request it.

The impetus for organizing a Standing Committee of Salaried Dentists began in earnest in 1981 when the CDA established an ad hoc committee to investigate the feasibility of such an organization. This committee, chaired by Dr. Tom Curry, recommended that a second committee be

Brigadier-General J.N. Wright

established to investigate the pros and cons of a national organization of salaried dentists. Members of this committee included chairman Gen. Wright, Dr. J.W. Niedermayer, representing non-salaried private practitioners, Dr. K. Ryan, representing provincial salaried dentists, and Dr. A. Schwartz, representing institutional salaried dentists.

The recommendations made by this committee — including the major one suggesting a Standing Committee be established — at the Interim Board of Governors meeting on March 3, 1983, formed the basis of the resolutions which were approved at the Board of Governors meeting during the national convention.

"It was the perception by a certain number of salaried dentists that they were not receiving consideration in certain instances by the CDA," explained Gen. Wright. It was felt that a committee acting within the confines of the national association would be the most appropriate vehicle for expressing the concerns of the salaried dentists to the CDA.

The Executive Council, along with Gen. Wright, is presently deciding who will sit on the committee. The remaining members must include one representative from each of any two provincial salaried dentists' associations, a representative of the Association of Canadian Faculties of Dentistry and a self-employed private practitioner who will be, preferably, a member of the CDA Board of Governors and not from a province represented by any of the other members.

**Heather Lang-Runtz is a freelance writer in Ottawa, Ontario*

NATIONAL DENTAL HEALTH MONTH CAMPAIGN STRESSES FITNESS

*by Heather Lang-Runtz**

"Start your day the right way, every day, with the 3 minute workout. Keep your teeth and gums healthy by brushing, flossing and rinsing at least once a day. Feel better. Look better. Eat nutritious meals, avoid snacks and visit your dentist regularly."

Making the 3 minute dental workout part of everyone's total fitness program is the theme of this year's annual National Dental Health Month campaign. CDA's communications department and provincial campaign organizers, who approved the new campaign package at a special NDHM workshop held in Ottawa on November 25, 1983, hope that this message will be appealing because of its obvious tie-in with the fitness craze.

The message has been reproduced in a variety of forms for the different media. There will be television spots and public service announcements, radio plugs, advertisements in the print media, buttons, decals, posters and newspaper articles.

In addition to these items, the CDA has prepared its popular planning kit for distribution to the provincial campaign organizers. This year's kit has been completely reworked: "Facts for Spokespersons" contains interesting statistics, tidbits and dental myths; a complete list of resource aids on brushing, flossing, fluoridation, plaque, dental caries and nutrition, along with addresses where they can be obtained, is included in the "Suggestions for Speakers" section; new dental health activities and experiments for grades kindergarten to 13 make up the "Dental Health Activities

for Schools'' section; the Catalogue and Order Form section has been updated to include where to order dental health videocassettes; and 11 new newspaper articles have been written.

These articles cover such topics as the dental workout, dentures, x-rays, nursing bottle syndrome, periodontal disease, orthodontics for adults, TMJ, sports injuries, current dental research in Canada, fluoridation and geriatric dentistry. They have all been typeset and printed, ready for reproduction in newspapers across the country.

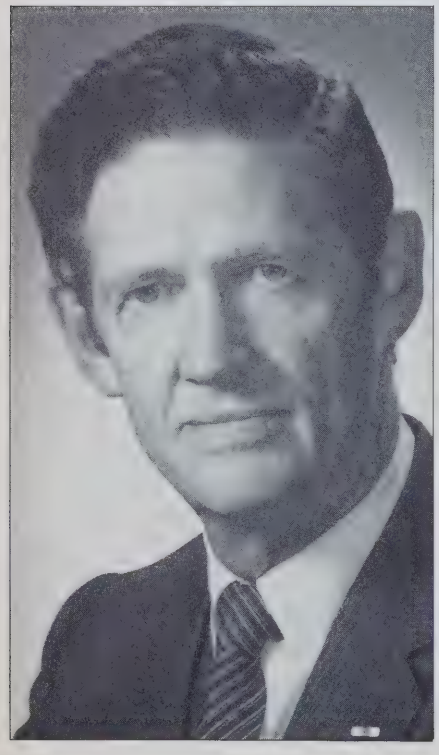
The planning kit also contains sections on publicizing a campaign, planning a successful campaign, highlights of last year's NDHM, the ever-popular Canada's Food Guide, Certificate of Appreciation forms and reproduction sheets featuring the 3 minute workout for the print media.

Campaign organizers hope that, with a new theme and new material, more publicity by the media and renewed general public interest will be generated for NDHM in April 1984.

DR. W. R. THOMPSON ELECTED FDI COUNCILLOR

Dr. William R. Thompson, immediate past-president of the Canadian Dental Association, was recently elected as one of the Councillors of the Fédération Dentaire Internationale (FDI).

Dr. W.R. Thompson



The Council of the FDI consists of the FDI President, President-elect, Treasurer and eight Councillors from various FDI member countries. This is the first time that Dr. Thompson has ever been elected as a Councillor, and only the second time that a Canadian has been elected to the FDI Council. The first Canadian to be so elected was Dr. W. G. McIntosh, also a CDA past-president for the year 1959-60.

''The FDI Council works in a very similar way to the CDA's Executive Council,'' Dr. Thompson told the Journal. ''The Council determines positions on general policy before these policies go to the FDI general assembly of delegates for discussion. The FDI general assembly is similar to CDA's Board of Governors,'' he said.

Dr. Thompson was elected for a three year term as a Councillor and he is no stranger to the workings of FDI. He was chairman of the FDI Commission on Defense Services for five years, during his service in the Canadian Forces. He has been the Canadian delegate to the FDI General Assembly for the past two years, and was the National Treasurer for Canada for another two years.

Dr. Thompson is retired from the Canadian Forces Dental Service and was CDA president in 1982-83.

AN EXCLUSIVE TO THE CDA JOURNAL

CANADIAN DELEGATION PARTICIPATES IN 71ST ANNUAL WORLD DENTAL CONGRESS IN TOKYO

by Mike Virgintino

Japanese music and warm greetings from local dignitaries opened the 71st Annual World Dental Congress of the Federation Dentaire Internationale, held for the first time in the Far East at The New Otani Hotel and Tower and the International Trade Center, November 14-20, 1983.

More than 17,000 delegates, 13,000 from Japan and the remaining from more than 90 other countries, attended the Tokyo Congress, held concurrently with the 15th General Meeting of the Japan Association for Dental Science. The Congress featured 360 lecturers on various phases of dental care and health.

The Canadian delegation, led by Canadian Dental Association President Dr. Robert Hicks, was the third largest foreign group. Of the 465 representatives, two-thirds were classified as dental practitioners.

''The value of the Congress,'' said Dr. Hicks, ''is it provides us with the opportunity to hear about recent clinical procedures, to learn of other research and teaching practices, to exchange opinions with dental experts from numerous other countries and to see the latest equipment. It is not only important that we learn of the different views of other foreign speakers, but to establish relationships with our foreign counterparts as friends and colleagues.''

Founded in Paris in 1900, the now London-based FDI is one of the largest international organizations concerned with medical care. It boasts a membership of over 400,000.

This year's concepts, and the planned FDI agenda for the next 20 years, included public education about proper dental care to prevent oral disease and establish worldwide dental health, adequate and equitable distribution of dental care in industrialized and developing nations, and assistance

Canadian Dental Association President Robert Hicks discusses issues during the 71st Annual World Dental Congress sponsored by the Federation Dentaire Internationale in Tokyo.

for developing nations to obtain more resources for oral health. These were arranged around the overall theme of "The Contribution of Dentistry to a Long, Happy and Healthy Life."

Dr. J. E. Ahlberg, FDI executive director, said 75 percent of all dental personnel live and work in industrialized nations where just 25 percent of the world's population resides. In some nations, he said, a surplus of specialists has led to unemployment among dentists.

The '83 FDI Dental Expo Tokyo, held at the nearby International Trade Center, was the largest ever in Asia. Three hundred international manufacturers and distributors displayed the latest dental materials, apparatus and pharmaceuticals, and dental and related literature. Exhibits included alloys, sterilizing equipment, cleansing agents and filling materials, and new and improved instruments and equipment.

Other Congress programs included scientific activities of the FDI's standing commissions – Dental Education and Practice; Oral Health, Research and Epidemology; Dental Products – and symposia sponsored by associated organizations.

The Asia-Pacific Symposium reported on special characteristics and traditions of oral health service in that part of the world. Another session focused on progress attained by ME equipment in computerized analysis of x-ray photos and ultra-sonic diagnosis. During this session, new procedures in diagnosis and treatment were introduced in accordance with the sophistication of Japan's electronic technologies.

Activities involving the Canadian delegation included approval of William R. Thompson, immediate past-president of the Canadian Dental Association, as one of two new FDI Councillors, and a speech about prevention achievements before the Commission on Oral Health, Research and Epidemiology by Professor John Stamm of the University of Toronto, Faculty of Dentistry.

Dr. Hicks praised the well organized program organized by FDI and the Japan Dental Association, and added The New Otani was the right choice to host an assembly of this size.

"The hotel has made possible the centralizing of numerous programs within its premises, while its staff efficiently handled the large groups. The Canadian delegation was awed by its beauty, especially the large and historic Japanese garden, the excellent and hospitable service and the vast selection of shops, dining and other activities."

The 1984 World Congress is scheduled for Helsinki, Finland, August 25-31. The Congress will return to Asia in 1986, when Manila will be the host city.

Editor's Note:
Mr. Virgintino was attending the FDI Congress in Tokyo and was covering the events exclusively for the CDA Journal.

ORTHODONTISTS HOLD ANNUAL CONVENTION

The Canadian Association of Orthodontists will be holding their annual convention in conjunction with the conjoint CDA-ODQ convention being held in Montreal April 8-12, 1984.

The Orthodontists' Association will be holding their convention at the Hotel Bonaventure in Montreal, April 8-10, 1984. Registration begins April 8, and on the same day both the Association executive and Board of Directors meet.

The scientific program for the Canadian Association of Orthodontists begins April 9, and includes Dr. Richard Litt speaking on "Surgical Orthodontics: Science or Art." The afternoon will feature Dr. Robert Rubin on "The Influence of Nasal Obstruction on Facial Growth and Occlusion."

April 9 will also be a day when the industrial exhibits will be open all day, and the main social event of the day will be a gala social evening for orthodontic delegates and their spouses.

Tuesday April 10, the Canadian Association of Orthodontists will be featuring two of the more popular lectures which will be taking place at the CDA-ODQ convention at Montreal's Palais de Congres. The Grieve Memorial Lecture will be a highlight of the morning and Dr. Thomas Graber speaking on "TMJ Function and Dysfunction: Diagnosis and Treatment" will be the afternoon's program.

For further information on the Canadian Association of Orthodontists convention, contact: Dr. O. Kopytov, Convention Chairman, 3535 Queen Mary Rd., Suite 309, Montreal, Que., H3V 1H8, 514-735-4246.

APRIL IN MONTRÉAL

CDA-ODQ/Conjoint Convention Will Offer Memorable Educational and Social Events

The stage is set for a major dental happening in early April in vibrant Montréal.

Through a unique arrangement between the Canadian Dental Association and the Ordre des dentistes du Québec, the 1984 convention of both organizations is being held conjointly in Montréal's spacious new Palais du Congrès, April 10-12.

Outstanding international speakers, from as far distant as France, will conduct scientific sessions in English and French languages. Simultaneous translations will be provided in each official language. Subject matter will include: Hepatitis B, new dental materials, CPR, computers in dentistry, time management and pharmacology.

A wide array of table clinics will continue on Wednesday April 11 of the convention.

Major social events will contribute to making the occasion even more memorable. This aspect will include an "April in Montreal" evening, with a hot and cold buffet, a surprise show featuring top-flight entertainment and non-stop dancing. This will be staged on Thursday, April 10, in the Queen Elizabeth Hotel. The following day, the highlight will be the Presidents' Gala at the Sheraton Centre Hotel. This promises to be a spectacular event in honor of the presidents of both the CDA and the ODQ.

Spouses at the convention will be able to enjoy a complete program in French and English, tailored to satisfy every interest. These attractions include a "Matinée at the Montréal Stock Exchange," a seminar on personal analysis through colors, a tour of a major shopping centre, sightseeing tours of Montréal, old and new, a wine-tasting party and a champagne breakfast followed by a conference on "Time Management."

Pre-Convention sessions

Pre-convention sessions will also provide opportunities to hear some outstanding speakers on timely topics, during specialty group programs.

On Friday, April 6, the Royal College of Dentists of Canada will hold its annual meeting and dinner and Convocation ceremony.

The Canadian Association of Orthodontists Convention is being held in the Hotel Bonaventure and the Palais des Congrès April 8-10. During that period, the annual Grieve Memorial Lecture will be delivered by Dr. Thomas Graber of Illinois on the subject of Orthodontics. A sparkling spouses' program has also been arranged.

The Canadian Academy of Periodontology will hold their annual meetings during the same period – April 8-10. A feature of these sessions will be the National Teaching Conference in Periodontics at the Sheraton Centre Hotel on Monday, April 9. Outstanding speakers will make presentations.

The Canadian Academy of Restorative Dentistry will also hold its meeting previous to the CDA/ODQ Convention. These sessions will be conducted on April 6 and 7.

Pre-Convention courses

A number of pre-Convention Limited Attendance Courses will be offered in both

French and English, at the Queen Elizabeth Hotel, on Sunday and Monday, April 8 and 9. The subject matter will include: Marketing of Professional Services, Restorative Procedures and a conference on clinical pathology.

Hygienists

The Canadian Dental Hygienists Association will hold its annual meetings on Tuesday, April 10. The CDHA president's luncheon is also scheduled on that date.

Presentations in the CDHA scientific program will cover such topics as Financial Planning, the Past Twenty Years and the Next Twenty Years, Creative Marketing in Public Health Dentistry, Dentistry for Handicapped Children and Dental Health Residency. A number of table clinics will also be conducted.

The social program includes the president's luncheon and a wine and cheese reception on Wednesday, April 11.

Dental assistants

The Canadian Dental Assistants' Association and the hosts, the Québec and Montreal Dental Assistants' Associations, will provide a program in French and English on matters such as Time Management and "Touch Your Patients With Love". Their annual meetings will take place on Tuesday, April 10.

The Assistants' social program includes the "April in Montréal" evening on April 10 and a visit to a maple sugar camp on Wednesday, April 11.

A Dental Technicians' program has also been arranged through the auspices of the Corporation of Dental Technicians of Québec.

The technicians will hear, in English or French, about modern ceramic techniques in dentistry and be able to attend scientific lectures, as members of the CPTDQ. Table clinics are scheduled, along with audio-visual presentations.

To miss Les Journées Dentaire — CDA Joint Convention would be to miss a highly informative and enjoyable experience. There is something for everyone!

CONVENTION AT A GLANCE 1984: LES JOURNÉES DENTAIRES

The following table lists all the events taking place at the CDA-ODQ conjoint convention, "Les Journées Dentaires 1984", between April 8 and April 12, 1984. The following symbols indicate on the table under which part of the total program the events take place.

PC: Pre-convention courses/Pre-congres

SC: Scientific program/programme scientifique

HY: Dental Hygienists/hygiéniste dentaires

DA: Dental Assistants/Assistants(es) dentaires

SP: Spouses program/Programme des conjoints

SO: Social program/Programme social

DT: Dental Technicians/Techniciens dentaires

DATE	EVENT
April 8	Dr. F. Edwards: The Marketing of Professional Services (PC) Drs. P. Duquette and R. Langlais: Conference Clinico-Pathologique (Programme 1983 en reprise) (PC)
April 9	Dr. A. Fillistre: Predictable Restorative Procedures (PC) Dr. A. Vaillancourt et Associés: Journée d'étude en prothèse complète (PC)
April 10	Dr. G. Kramer: Images of comprehensive dentistry Dr. Zia Shey: Pedodontics for the GP (SC) Mr. Bo Braze: Modern Ceramic: Technique in Dentistry (SC) (DT) Dr. T. Graber: Grieve Memorial Lecture (SC) Dr. H. Baltadjian et al: Pot Pourri cliniques (SC) Dr. R. Lawlor: L'Hepatite B. (SC) Dr. N. Brien: Prothèse Partielle Amovible (SC) Dr. R. Taché: Prothèse Complète (SC) Dr. P. Vaktor: R.C.P. (SC) Pat Johnson: The past twenty years (HY) Sylvie de Grandmont: Le rôle de la Corporation (HY) S. Amer-French: The next twenty years (HY) K. Ball: Financial Planning (HY) Presidents Luncheon (HY) Dr. R. Lawlor: Hépatite B (DA) April in Montreal/Avril à Montréal (HY, DA, SO, SP) Montreal Stock Exchange/ Bourse de Montréal (SP) Personal Colour Analysis/ Cours sur l'analyse personnel des couleurs (SP)
April 11,	Dr. G. Denehy: Getting the most out of composite resins (SC) Dr. G. McGivney: Removable Partial Dentures (SC) Dr. D. Ahn et al: Clinical Pot-Pourri (SC) Dr. P. Vaktor: CPR (SC) Dr. R. Langlais: Oral Pathology (SC) Dr. J. Korbendau: Périodontie (SC) Dr. V. Legault: Pédodontie (SC) Dr. M. Diner: Pédodontie (SC) Drs. W. Donohue and R. Fisher: Traitement de patients atteints de cancer (SC) Table Clinics/Entretiens cliniques (HY, SC, DT) Dr. S. Green: Creative Marketing in the public health industry (HY) C. Wooley: Dental hygiene residency (HY) S. Frechette, J. Langlois: Les enfants handicapés (HY) Table Clinics/Entretiens cliniques (HY, SC, DT) Audio visual/audio-visuel (HY, SC, DT) Wine and Cheese reception (HY) P. Burger: Touch your patients with love (DA) Maple Camp Party (DA) City Tours/Visites de la Ville (SP) Wine Tasting/Dégustion de vins (SP) Presidents Ball/La Soirée de gala des Présidents (SO) Dr. A. Aaron: (DT)
April 12,	Dr. H. Weiner; Endodontics (SC, HY) Dr. M. Belcourt: Time Management (SC, HY, DA, SP) Dr. W. Shaw: Computers in Dentistry (SC, HY, DA) Dr. R. Jones: Occlusion (SC, HY, DA) Dr. H. Lemay: Pharmacologie (SC, HY, DA) Dr. P. Desautels: Matériaux dentaires (SC, HY, DA) Montreal tours/Visites de la ville (SP)

It should be noted that all scientific programs (SC) take place at the Palais de Congrès, and all pre-convention courses (PC) take place at the Queen Elizabeth Hotel. For complete information, fill out the registration form on page 115, and take a look at the registration guide on page 115.

REGISTRATION GUIDE

Registration Form

1. Please fill in and return one form per person – only the name of the spouse should appear on the delegate form. One cheque may accompany more than one form.

   Some social events are not included in the basic fee and must be counted as extra. Please read carefully the information given on the form.
2. You will receive an acknowledgement of receipt which will confirm all the details pertaining to your registration.
3. Les journées dentaires du Québec will be in two (2) parts:
   (a) Pre-Convention – Queen Elizabeth Hotel: April 8-9
   Pre-Convention Registration gives access to the reserved session(s) of your choice. Note that the Pre-Convention Registration is totally different from the Convention Registration.
   (b) Convention – Palais des Congrès: April 10-12
   – Conferences
   – Commercial exhibition
   – Programs for auxiliaries
   – Audio-visual program
   – Table Clinics
   – Social program (Queen Elizabeth Hotel & Sheraton Centre)
   – Spouse program (Queen Elizabeth Hotel)
4. Registration deadline: Pre-registration must be received by February 28, 1984 after which date they will be returned to sender. On location registration will be $10.00 more per person.
5. All delegates who register before the February 28 deadline will have a chance to win two Air Canada tickets to any place served by the company.

Plane reservation

An agreement has been established with Air Canada in order that delegates have an Air Canada office specially set up for them.

Hotel reservation

Two hotels offer a special rate of $75.00 (single or double)

– Queen Elizabeth Hotel
  *Headquarters for les Journées dentaires du Québec, the Canadian Dental Association and l'Ordre des dentistes du Québec
  *Reserved sessions of April 8-9
  *"April in Montreal" party
  *Spouse program
– Sheraton Centre
  *Headquarters for hygienists and assistants
  *Presidents' Gala

N.B.: All hotel reservation forms must be returned to the Convention headquarters.

LES JOURNÉES DENTAIRES 1984
CDA/ODQ Joint Convention – Montreal
3565, Berri Street, Suite 200, Montreal, Que., H2L 4G3
April 8-12, 1984

ADVANCE REGISTRATION FORM – TO QUALIFY FOR THE AIR CANADA DRAW
SEND IN THIS WITH CHEQUE BEFORE FEBRUARY 28, 1984
REGISTRATION DURING CONVENTION WILL BE INCREASED BY $10.00 EACH

ONE FORM PER PERSON DUPLICATE FORM FOR MULTIPLE REGISTRATIONS

Name _____

Address _____ Postal Code _____

Telephone no. (Bus.) _____ (Residence) _____ Spouse's name, if attending _____

Please check appropriate classification: ☐ Dentist ☐ Hygienist ☐ Assistant ☐ Technician ☐ Spouse

PRE-CONVENTION – LIMITED ATTENDANCE COURSES APRIL 8-9, QUEEN ELIZABETH HOTEL

English Language

April 8 — Dr. Francis Edwards, MARKETING OF YOUR PROFESSIONAL SERVICE ..... Dr. ..... 75.00 _____
(Simultaneous translation available) Ass., Hyg. ..... 35.00 _____

April 9 — Dr. Alvin Fillastre, PREDICTABLE RESTORATIVE PROCEDURES ..... Dr., Tech. ..... 75.00 _____

French Language

April 8 a.m. — Dr. Pierre Duquette, CONFÉRENCE CLINICO-PATHOLOGIQUE* (Repeat 1983 program)
Dr. ..... 40.00 _____

p.m. — Dr. Robert Langlais, CONFÉRENCE CLINICO-PATHOLOGIQUE* ..... Dr. ..... 40.00 _____
*Participation course

April 9 — Dr. Alain Vaillancourt & colleagues.* JOURNÉE D'ÉTUDE EN PROTHÈSE COMPLÈTE
Dr., Tech. ..... 75.00 _____

* – Dr. Claude Lamarche – Dr. Normand Tardif
– Dr. Huan Pham – Dr. Jacques Valiquette – Dr. Aldo Camarda

Registration form continued

CONVENTION — APRIL 10, 11 AND 12 LE PALAIS DES CONGRÈS — CONVENTION CENTER

Please check appropriate box:

☐ DENTIST/member of the Order of Dentists of Quebec
Registration fee included in licence fee . . . . . nil _____
Includes: access to scientific sessions, exhibits, three (3) lunches, social events need separate reservations, see below

☐ DENTIST/licensed outside of Quebec
Includes: access to scientific sessions, exhibits, three (3) lunches, Monday welcoming reception. Tuesday evening soirée (April in Montreal), Presidents Ball need separate reservation, see below

CDA member/ADA member/foreign dentist . . . . . 195.00 _____

CDA Non member . . . . . 225.00 _____

April 11 CPR course limited to 40 persons: Will attend ☐ Yes ☐ No

SOCIAL EVENTS

☐ Tuesday Evening — **APRIL IN MONTREAL** (included in certain registration packages) _____ per person/20.00 _____

☐ Wednesday evening — **PRESIDENTS BALL** (not included in any package) _____ per person/40.00 _____

☐ Spouse _____ per person/50.00 _____
Includes: access to scientific sessions, exhibits, Tuesday evening soirée (April in Montreal), personal colour analysis, shopping tour, city bus tour, wine tasting, champagne breakfast, tour of stock exchange (a limited attendance registration on a first come basis on site at the convention for certain programs)

☐ Hygienist _____ 75.00 _____
Includes: access to scientific sessions, exhibits, CDHA lecture series. Tuesday President's lunch. Tuesday evening soirée (April in Montreal), Wednesday lunch and wine and cheese reception.

☐ Assistant _____ 60.00 _____
Includes: access to scientific sessions, exhibits, CDAA/AADQ/AADM Lectures, Tuesday evening soirée (April in Montreal), Wednesday night Maple Camp Party

Members of CDAA/AADQ/AADM will receive additional social events. Further information available at registration.

☐ Technician/member CPTDQ _____ 65.00 _____
Includes: access to scientific sessions, exhibits. Social events need separate reservation (see above)

☐ Student _____ nil _____
On site registration only/Includes: access to scientific sessions and exhibits For final year student of Dental, Dental Assisting, Hygienist, Dental Technician Schools

TOTAL: _____

PLEASE MAKE CHECK PAYABLE TO:
CDA/ODQ JOINT CONVENTION
3565, Berri Street
Suite 200
Montreal, Quebec
H2L 4G3

CANCELLATION POLICY:
Cancellations **accepted before March 15** for full refund. Any cancellations after that date subject to a 25% administrative charge.

REGISTER PRIOR TO FEBRUARY 28 AND BE ELIGIBLE TO WIN TWO COMPLIMENTARY TICKETS TO ANY OF AIR CANADA'S WORLD DESTINATIONS!

HOTEL RESERVATION FORM

(Please duplicate form if more than one room reservation is required)

NAME _____
(please print)

ADDRESS _____

_____
(including province, state and country) (zip code/postal code)

TELEPHONE NO. (Bus.) _____ (Residence) _____

PLEASE CHECK DESIGNATION ____ Dentist ____ Hygienist ____ Assistant ____ Technician ____ Student ____ Exhibitor
____ Other (please specify) _____

HOTEL CHOICE:

Queen Elizabeth Hotel (Canadian Dental Association/Order of Dentists of Quebec Convention Headquarters)

☐ Single $75.00 ☐ Double/Twin $75.00 ☐ Other, please specify . . . . . .

Sheraton Center (Hygienists & Assistants Headquarters)

☐ Single $75.00 ☐ Double/Twin $75.00 ☐ Other, please specify . . . . . .

Arrival Time and Date _____ Departure Date _____

HOTEL WILL CONFIRM RESERVATION DIRECTLY WITH DELEGATE. ANY SUBSEQUENT CHANGES TO THE RESERVATION SHOULD BE MADE DIRECTLY WITH THE HOTEL.

PLEASE MAIL TO:
CDA/ODQ CONVENTION, 3565, Berri Street, Suite 200, Montreal, Quebec H2L 4G3

Briefly

Officials of the Newfoundland Dental Association noted recently that that province's health department has plans to mount a campaign to promote dental health. The Association also wants the department to promote the Children's Dental Health Program. The emphasis of the childrens' program is in covering the cost of preventive dental treatment. For children to the age of 13, the program provides one fluoride treatment, two examinations and one set of X-rays, free, per year. There is a charge of only $2 for fillings or tooth extractions and the program covers the remaining cost. Toby Gushue, chairman of the Newfoundland Dental Association's public relations committee told a newspaper reporter that a surprising number of people in Newfoundland were unaware that the children's program exists.

Dr. Daniel Greene was elected president of the Newfoundland Dental Association at the NDA annual meeting in St. John's. Dr. Paul O'Brien is the first vice-president and Dr. James Flynn, second vice-president. Dr. Gary MacDonald is the past president. Treasurer is Dr. Ed Williams and Dr. Toby Gushue is executive secretary.

The Nova Scotia Dental Association recently submitted a brief to that province's select committee on health, recommending, among other things that the provincial health department conduct a promotional campaign to heighten dental awareness of the desirability of good dental health and of the children's dental program. It also pointed out that there are areas of Nova Scotia where adequate dental care facilities are lacking. The brief was delivered by the NSDA President, Dr. J. M. Creighton.

The Ordre des Dentistes du Quebec recently commissioned an opinion poll which produced some interesting results.

According to ODQ President, Dr. Marc Boucher, "The principal aims of this poll were to discover the perceptions of Quebecers concerning the necessity for dental care, to measure the degree of approval and confidence towards the dentists and to guide the ODQ's activities during the coming years."

While the poll indicated that people in Quebec are interested in maintaining dental health, it also indicated that Quebecers do not necessarily follow this up by visiting their dentists regularly.

Certain areas, according to the poll, are in need of clarification. For example, modern treatment methods and dental fees. The poll also indicated that patients in Quebec don't like surprises in their dental treatment and tend to become anxious at the prospect of becoming involved in treatments in which scope and costs are uncertain.

The dentist in Quebec, according to the poll, is liked and well respected, and the poll showed that the relationship between dentist and patient in the province is good.

Dr. Boucher said that the results of the poll will undoubtedly provide a useful guideline for dentists in Quebec in the future.

In the December 1983 issue of the Journal, it was announced that the Ordre des Dentistes du Quebec would soon have available a newsletter for dental patients.

According to the latest edition of "Amalgame", the Order's newsletter, plans for the newsletter to dentists' patients in Quebec have been temporarily shelved.

If and when the newsletter becomes a possibility once more, Journal readers will be informed.

A Windsor dentist, Dr. George Grayson, who acts quietly as a consultant to a Detroit group — the Executive Dental Group — played a role in exhibiting the most revolutionary dental advances being applied in North America today at the recent Business Expo in Detroit, the largest business show in the United States. One of the major purposes of the dental exhibit, in addition to displaying and explaining the use of composite resins, was to create more dental awareness to try to reach the 50 per cent of people who never visit a dentist's office.

The Canadian Academy of Oral Pathology recently elected its officers for 1984 and beyond.

New president of the Academy is Dr. G. Wysocki, of London, Ontario, while the new President-elect is Dr. David Mock of Toronto. Vice-president is Dr. D.G. Gardner of London, Ontario, and Secretary-Treasurer is Dr. R. Priddy of Vancouver, B.C.

Three committees were also selected during recent elections. These include Nominations: with Dr. Priddy, Dr. W. Maxymiw of Toronto, and Dr. B. Harsanyi of Halifax as members. The Membership Committee consists of Dr. R.J. McComb of Toronto, Dr. B. Blasberg of Vancouver and Dr. John Hardie of Ottawa as members. The Professional and Public Relations Committee has as members: Dr. R. Morency of Montreal, Dr. T. McGaw of Edmonton and Dr. M. Cohen of Halifax.

"Superscrounger" is about to be honored again.

Bob McAllister, the former Azilda, Ontario, Lion's Club president, who has gained a reputation worldwide for his work in getting dental and hospital equipment to South America and the Caribbean, is going to be receiving one of Peru's highest awards.

The "Order of the Sun" will be presented to Mr. McAllister later this month for his work in setting up dental and hospital clinics in Peru. Mr. McAllister is one of the first Canadians ever to receive this award.

Bob McAllister

A recent national survey suggests that school students in Saskatchewan, Nova Scotia and Manitoba are the best informed about good health habits. However, it indicated that children in Ontario are among the least informed in this country. The survey, which was sponsored by the national health and welfare department, polled 28,095 children in Grades Four, Seven and Ten on a variety of questions about nutrition,

safety, fitness, dental hygiene and sexuality. Results showed that Saskatchewan school children are best informed about health education, in all three grades polled.

Dr. Robert S. Turnbull, of Mississauga, Ontario, recently assumed the position as President of the Ontario Society of Periodontists. His term is for two years.

Dr. Turnbull is a professor of periodontics at the University of Toronto, Faculty of Dentistry and has been the English scientific editor of the CDA Journal for several years.

Dr. Robert Turnbull

Any Canadian dentists who have any good old photographs of happenings at the American Dental Association, are asked to send them in to ADA for possible publication.

The April 1984 ADA Journal will be a special issue commemorating the 125th Anniversary of the founding of the ADA. Photographs should be good quality black and white or colour, of U.S. national interest, and identified with the history of the American Dental Association. Each photograph should be accompanied by the owner's name. The ADA Journal will use the photographs as space permits.

Send your photographs to: Mr. John Goetz, Managing Editor, American Dental Association, 211 E. Chicago Avenue, Chicago, Ill., USA, 60611.

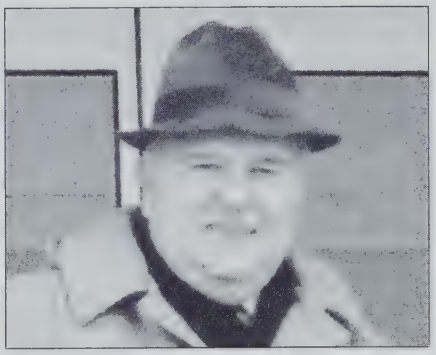
In 1982, Americans spent a total of $322.4 billions on health care. Of that total, $19.5 billion, or six cents on the dollar, went for dental care. By comparison, total health care costs in 1981 were $286.6 billions, when dental care costs accounted for $17.3 billions. For the past decade, dollar amounts have increased each year, but dentistry's share of the health care bill have remained at about six per cent. (The statistics quoted do not include expenditures for oral hygiene products such as toothpaste or floss).

Dr. Victor Chatwin, formerly CDA's Director of Accreditation, has been accorded an unusual honor.

In late December, he was awarded an Honorary Membership in the Canadian Dental Assistants Association, for his work in the accreditation field with that organization through the CDA.

At press time, he had not yet received his honorary membership, but it was expected to be presented to him in the near future.

Dr. Victor Chatwin



In a recent newsletter of the Canadian Society of Dentistry for Children, it was pointed out that there is currently a campaign is going on in the U.S. to ensure that children's dentistry remains a priority with federal health care programs.

To make sure that children's dentistry gets a fair shake with government, the American Academy of Pedodontics is considering the formation of a legislative committee. This committee would bring the concerns of children's dentistry to federal officials.

Concerned pedodontists are currently being sought in the U.S. who would like to become involved in a letter writing campaign to federal officials, on issues of concern to childrens' dentistry.

The newsletter suggested that pedodontics in Canada may be taking a "back seat" to other branches of dentistry, and that perhaps Canadian pedodontists should consider a campaign similar to that going on in the U.S.

Results of the CDA membership campaign in Ontario and Quebec have been quite encouraging to date.

Figures for Ontario had increased substantially by late January, and the Quebec total of paid members had already climbed well beyond the 1983 figure for that whole year.

The success rate may well be due in part to some innovative procedures employed by the Membership Committee. Volunteers assisting the committee have, for example, been entering personal commentaries to colleagues with whom they are personally acquainted. The comments in the third-mailing letters are urging potential members and present members to join CDA or pay their dues before March 31. (Following that date, those who default will lose the benefit of all CDA services, including the CDA Journal.)

Recent members or potential members not fully acquainted with the range of member services may learn about these benefits by reading the series of in-depth articles that appeared in the Journal from last September until January, providing details of the major CDA services.

The Membership Committee would welcome further volunteer service by any member aware of potential member colleagues. Such an expanded scope of contact would make the campaign even more successful.

CDA Retirement Savings Plan

Unit values of the Canadian Dental Association's Retirement Savings Plan stood as follows on December 31, 1983.

Common Stock Fund	$78.66773
Fixed Income Fund	$37.95691
Guaranteed Fund	$27.50841
Balanced Fund	$15.62012

Total assets (market value) of the plan were $38,594,895.

The previous month's figures, as of November 30, 1983, stood as follows:

Common Stock Fund	$78.01933
Fixed Income Fund	$37.71952
Guaranteed Fund	$27.29416
Balanced Fund	$15.45642

Total assets (market value) of the plan were $38,443,579.

For further information write to: Canadian Dental Service Plans Inc., Ste. 600, 2 Lansing Square, Willowdale, Ontario M2J 4Z3 or call the central information services of CDSPI at 1-800-268-5418 (toll free number for Western Canada, Atlantic Canada and Ontario for Code 807 only, 1-800-268-3411 (toll free number for Quebec and Ontario except Code 807), and 497-7117 (Metro Toronto area).

FÉDÉRATION DENTAIRE INTERNATIONALE MEMBERSHIP

Membership in the Fédération Dentaire Internationale for 1984 is now open for new or renewed membership. Supporting membership from Canada and attendance at the Tokyo Congress was significant and it is hoped that such support will continue. After the March 1984 issue, only those who renew their membership will continue to receive the Newsletter and in addition, it is necessary to be a supporting member to attend the outstanding Congress planned for Helsinki, Finland on August 25-31, 1984.

Registrants to FDI world congresses must be supporting members of the Federation. To be eligible for supporting membership, Canadian dentists must be members of the Canadian Dental Association.

The subscription fee is $35 (Canadian) or in combination with a subscription to the International Dental Journal $62 (Canadian). We urge you not only to become a member but to encourage your colleagues to join as well.

Your membership fee is your contribution in support of FDI in its efforts to promote improved dental health on a worldwide basis in direct exchange of scientific knowledge and expertise. A portion of the fee will also be used by the CDA to offset administrative expenses associated with the FDI membership program.

Please return the attached form with your remittance without delay to the Canadian Dental Association, 1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6.

CANADIAN DENTAL ASSOCIATION

1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6

MEMBERSHIP APPLICATION FÉDÉRATION DENTAIRE INTERNATIONALE

— To develop contacts with dentists from around the world

— To be part of your profession's voice in the international community

— Fees include administration cost, U.S. premiums, CDA representation to FDI

_____ $35 FDI Supporting Membership will receive the Quarterly FDI Newsletter and Membership Card

_____ $62 FDI Supporting Membership and Subscription to International Dental Journal

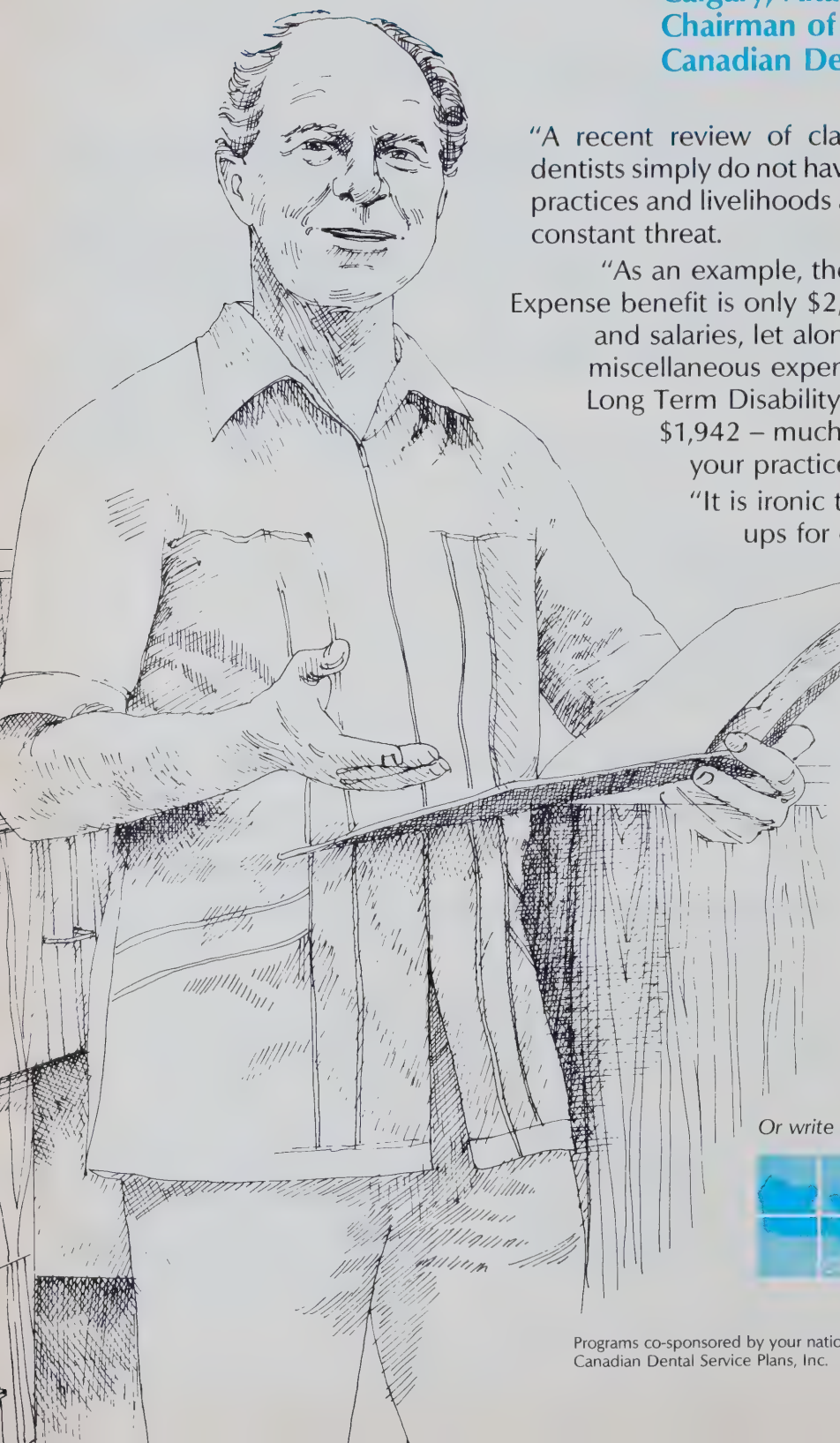
NAME _____ ADDRESS _____

THIS IS NOT A LICENCE FEE, this is your remittance for annual supporting membership.

Please return this form with your remittance payable to CDA. A receipt and membership card will be issued.

"Most dentists are under insured. Who's going to make up the difference between losses and coverage?"

Roy L. Rasmussen, DDS,
Calgary, Alta.,
Chairman of the Board,
Canadian Dental Service Plans, Inc.



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Letters

U. OF MAN. SYMPOSIUM PRAISED

This cheque, which you find enclosed, I present to the University of Manitoba as my everlasting gratitude, as a symbolic expression of good will, enthusiasm and truthfulness in my 21 year teaching career.

I certainly feel that this Alma Mater of mine (the fifth and last one in my earthly life) gave me not only a chance to educate, but also to be a permanent student. I feel that to be a student a whole life long is the greatest pleasure an intelligent individual can have.

I certainly know, that being 65, my earthly life is rather going very speedily to the end. And I certainly accept that as I accept the income-tax regulations. However I am very very sorry, that my enthusiasm to learn, to create, to give to others and to seed the truthfulness is going to be cut off by the law of nature. Therefore, no matter how long I am going to live and work for our school I wish I could continue implanting in my dear students the idea of real humanism and real professionalism in our rather small field, which is dentistry.

Last week's "Symposium 25" is the greatest compliment to our University, to our Faculty, Dr. Shwartz as dean, who with great administrative experience and tactfulness, approved and encouraged the Organizing Committee and the actual originators of the whole conference. And they are:

Ian Hamilton
George Bowden
Colin Dawes

I am positive, that the rest of us share my opinion and will continue to help them in their noble work as they did in the past.

My minimal contribution to perfect dental restorations is fading away in comparison to what these 3 people did and I am certain will continue to do.

My cheque ($1,500.00) is for the purpose of providing the t.v. attachment for the stereoscope, which was bought last year.

Taras G. Snihurowycz, D.M.D.
Associate Professor
University of Manitoba
Winnipeg Man.

Editor's Note:
Dr. Snihurowycz's letter was originally addressed to Dean A. Schwartz, Faculty of Dentistry, University of Manitoba, commenting on the recent symposium held at the University, as part of their 25th Anniversary celebrations. Since, beginning in this issue, the scientific papers from that symposium will be printed, it was felt that Journal readers would enjoy Dr. Snihurowycz's comments.

CONTINUING EDUCATION NOW A BUSINESS

Continuing education is a necessity for the profession of Dentistry in order to maintain the quality of sophistication needed to provide the best dental care for the community. In our formal training we are exposed to this concept by dedicated teachers.

Within the last few years, we the dentists, have been bombarded by courses given by companies who sponsor leaders in the profession to deliver their lectures. For this, very high lecture fees are charged. I am wondering if the profession is being manipulated by the business world? What has happened to the real professionals who gave of their knowledge to their collegues at a very minimal cost, which was essentially to cover the expense of the course and the expense of the lecturer? Are our dental societies falling short of their responsibilities in sponsoring such lectures? Is the profession really becoming a business to its own members?

Mark Lazare, D.D.S.
Pointe Claire, Quebec

QUESTIONS BOOK REVIEW

I feel that a comment is in order regarding *ADVANCES IN OCCLUSION* reviewed in the November 1983 issue of the C.D.A. Journal by Dr. Trevor J. Harrop.

I have recently purchased this textbook through the University of Washington bookstore, $49.95 (U.S.) and find none of the printing flaws Dr. Harrop mentions in his review. The paper is thick enough to view all illustrations and photographs clearly and easily. None of the pages are covered by the black dots which Dr. Harrop suspects all copies to have.

I wanted to mention this in case other readers might hesitate to purchase this textbook solely because of printing flaws in Dr. Harrop's copy of Lundeen & Gibb's book. Oh, how I wish that a text of this high calibre had been available when I graduated from dental school (Dalhousie University 1967).

William D. Brymer, D.D.S.
North Vancouver, B.C.

NOVEMBER EDITORIAL OFFENSIVE

As a practising dentist in the maritime region I must write and take exception to the editorial in the November Journal. I feel that it is unfortunate to see a member of the profession disillusioned to the extent he would write such a condemnation of his confreres not only as professionals but as people in general.

The opening quote by the "author" is particularly offensive and I hope that things have not regressed to the point in "Upper Canada" that this would imply. I personally feel that in our area the opposite situation holds true and we are quick to praise the "last man to slip a filling" in a mouth if it so deserves and if it doesn't – we are just as quick to keep quiet.

Not knowing the circumstances under which restorations are placed prohibits anyone the right to condemn them, especially to the patient. Ethics would dictate these actions and if one feels some dental malpractice has occurred the dentist in question should be contacted first.

The remainder of the article is just as difficult for me to relate to and it is ironic that the Journal should arrive on a day when I have spent an hour on the phone to two different specialists and another dentist in three maritime centers "picking their brains" as it were for information willingly offered.

As well, this very evening I hope to spend 2 or 3 hours in very congenial conversation over many and varied dental topics with the 6 other members of our local study club. This then leaves me with the only consoling fact on reading this article if I must believe the author to be sincere. This is the hope that this type of isolationism and open degradation within the profession is confined to areas other than to one I am proud to practice in.

Brian D. Barrett, DDS
Charlottetown, PEI

RRSPs – A FACTUAL EXPERIENCE

Dear Sir:

The information given in the C.D.A.s brief on Pensions should be analysed carefully before committing money to the pressure tactics of financial custodians. The following extracts.

One of the first series of C.D.A. Retirement Saving Plans (Royal Trust) was terminated in 1973, on retirement at age 68.

The RRSP savings amounted to $29,403.57. To reinvest this money two options were available – annuities, or cash withdrawal and pay income tax on total amount. The annuity gave a very low rate of return on capital.

By purchasing a 10 year guaranteed life annuity the recipient received $237.75 a month, equal to $2,852.76 yearly. During the 10 years, 1973-1983, the recipient loses all of his capital. Revenue Canada, with its T4R-SP forms declares a taxable income of $28,527.60, which amounted to $2,852.76 each year. This in spite of the fact the original capital had disappeared to zero by 1983. When inflation is considered the $237.75 monthly pension had lost most of its 1973 buying power.

RRSPs are an accepted method of savings and reducing income taxes while the individuals earning ability remains.

But there are problems with RRSPs on retirement. People with low incomes and most of their savings in RRSPs will be hurt by paying income tax on much lower incomes. Individuals in the higher tax brackets can dismiss this tax as trivial.

It is unfortunate in todays modern society the art of managing money has disappeared and is left in the hands of third parties – for a fee of course.

A.C. Ahrens DDS. MSD.
Medicine Hat, Alberta

THIS IS IT – YOUR NEW JOURNAL

Several months ago, the Canadian Dental Association Journal staff conducted a readership survey. The objective was to obtain frank readership evaluation of the publication. Readers were invited to assess the strengths and weaknesses of the Journal to provide a foundation for change and improvement in its quality and content.

The results can be seen, beginning with this edition.

The new format and layout will be obvious to Journal readers. It has been redesigned in response to several criticisms revealed in the readership survey. There is a new concept in the handling of news and information, without the insertion of translation; the reader may now receive the Journal in the language of his or her choice. As many readers suggested, the format deliberately gives greater prominence to the scientific articles, which are the heart of the publication. The layout has been changed to accomplish this and to reduce the previous emphasis on headlines and white space.

The many readers who commented favorably on the news section, book reviews and "brieflies", will find that these desirable features have been preserved. Those who requested more articles of value to the "wet-fingered" general practitioner, can look forward to articles on clinical practice tips, practice management, personal finance and other practical topics.

As one reader aptly suggested, the JCDA can never succeed in being "all things to all people." The Journal can and should cover a range of the significant, clinical, scientific and professional interests of most dentists in a variety of settings. In order to do this, the Journal staff must determine periodically how readers assess it. The staff therefore, looks forward to hearing from readers informally on the changes and reaction to them. Another readership survey will be conducted after the first few issues in this new format have been published, and this will provide further information for the Journal staff to study.

Readers are welcome to comment at any time, in letters to the editor, by telephone, or otherwise. It is not necessary to wait until invited formally to respond to a readership study questionnaire. The CDA and the Journal staff believes the Journal should serve members in the best manner possible, and you, the reader, are in the best position to provide the necessary direction to achieve that objective.

The Journal staff will give any comments, at any time, the same serious consideration as those expressed in the readership survey.

Address your comments to:

The Editor,
CDA Journal,
1815 Alta Vista Drive,
Ottawa, Ont. K1G 3Y6

OBITUARIES/NÉCROLOGIES

COPPEL, D.L.: Dr. Coppel, a Life Member of the CDA, was born in 1913. He graduated from the University of Toronto in 1939 and was a resident of Windsor, Ontario at the time of his death.

DEGRANDMONT, C.: Né en 1909 et diplômé de l'Université de Montréal en 1936, le Dr. DeGrandmont habitait à Montréal au moment de son décès.

GOOD, A.G.: Dr. Good, a longtime resident of Woodstock, New Brunswick, graduated from the Royal College of Dental Surgeons in Toronto in 1923. He was a practicing dentist in Woodstock until 1961, and served that city as deputy Mayor.

GUENTHER, R.G.: Dr. Guenther, graduated from the University of Toronto in 1950. A member of the Canadian Armed Forces, he was practicing at the Dental Clinic at CFB Trenton, Ontario, at the time of his death.

LAFLEUR, Y.: Diplômé de l'Université de Montréal en 1927, le Dr Lafleur habitait à St-Hyacinthe, Québec, au moment de son décès.

MCWILLIAMS, H.C.: A life member of the CDA, Dr. McWilliams graduated from the North Pacific College of Oregon in 1934. He was born in 1908 and resided in Vancouver at the time of his death.

THIRD MOLAR EXTRACTIONS

EXTRACTION DE LA TROISIÈME MOLAIRE

1. Amin, M.M. and Laskin, D.M. *Prophylactic use of indomethacin for postsurgical complications after removal of impacted third molars*. Oral Surgery, v. 55, no. 5, May 1983, pp. 448-451.
   Abstract: Indomethacin (100 mg. per day for 3 days) was tested for its prophylactic effects on the postsurgical complications of pain, swelling, and trismus after removal of impacted teeth. The drug resulted in a significant reduction of the swelling and an analgesic effect which was equal to that of acetaminopen and codeine. Only two minor side effects were encountered.
2. Barclay, J.K., Hunter, K.M. and Jones, H. *Diazepam and lorazepam compared as sedatives for outpatient third molar surgery*. British Journal of Oral Surgery, v. 18, no. 2, September 1980, pp. 141-149.
   Abstract: A clinical trial was designed to compare diazepam and lorazepam when administered intravenously immediately prior to third molar surgery. The two drugs were compared on three scores, patient behaviour during surgery, presence of amnesia and extent of psychomotor impairment. Within the confines of the investigation the principle difference between diazepam and lorazepam was the greater degree of psychomotor impairment induced by the latter drug two hours postinjection.
3. Bishara, S.E. and Andreasen, G. *Third molars; a review*. American Journal of Orthodontics, v. 83, no. 2, February 1983, pp. 131-137.
   Abstract: The influence of the third molars on the alignment of the anterior dentition is controversial. There is no conclusive evidence to indicate the third molars as being the major etiologic factor in the posttreatment changes in incisor alignment. Various aspects related to the management of the third molars are discussed, and specific situations in which third molar extractions are contraindicated are illustrated.
4. Browne, W.G. *Lingual flap retractor for surgery in third molar area*. British Journal of Oral Surgery, v. 20, no. 2, June 1982, pp. 151-152.
5. Cameron, I.W. *An investigation into some of the factors concerned in the surgical removal of the impacted lower wisdom tooth, including a double blind trial of chymoral*. British Journal of Orthodontics, v. 18, no. 2, September 1980, pp. 112-124.
   Abstract: During the surgical extraction of 102 impacted lower wisdom teeth the following factors were studied: the amount of trauma applied during tooth removal; the duration of the operation; post-operative swelling; post-operative trismus; sex differences; the relationship between swelling and trismus; the pattern of development and subsidence of swelling with a clinical ''double-blind'' trial of the drug Chymoral.
6. Davis, W.H., Hochwald, D.A. and Kaminishi, R.M. *Modified distolingual splitting technique for removal of impacted mandibular third molars: technique*. Oral Surgery, v. 56, no. 1, July 1983, pp. 2-8.
   Abstract: This first of two articles describes a modified distolingual splitting technique for removal of impaction of various classes. The second article evaluates the efficacy of the technique by reporting and comparing the incidence of postoperative sequelae with earlier research findings. In this technique, the lingual soft tissue is not separated from the bone. In addition, the fragmented lingual bone attached to the periosteum is not removed. The procedure is best performed with the patient under sedation or general anesthesia.
7. Dubois, D.D., Pizer, M.E. and Chinnis, R.J. *Comparison of primary and secondary closure techniques after removal of impacted mandibular third molars*. Journal of Maxillofacial Surgery, v. 40, no. 10, October 1982, pp. 631-634.
8. Finne, K. and Klämfeldt, A. *Removal of lower third molar germs by lateral trepanation and conventional technique. A comparative study*. International Journal of Oral Surgery, v. 10, no. 4, August 1981, pp. 251-254.
9. Gersel-Pederson, N. *Fibrinolytic activity of blood and saliva before and after oral surgery*. International Journal of Oral Surgery, v. 10 Supplement 1, 1981, pp. 114-121.
   Abstract: Blood and saliva samples were collected from 120 healthy persons whose bilateral mandibular impacted molars were to be removed surgically. The samples were collected at preoperative examination, immediately after the operation and in the postoperative period. The fibrinolytic activity of the euglobulin fractions, precipitated at pH 5.9 from plasma and mixed saliva, was measured by the fibrin plate method. The clinical variables were: age, sex, use of peroral contraceptives and menstrual cycle, daily tobacco consumption, duration of operation and amount of local anesthetic. The fibrinolytic activity of blood was lower in smokers than in nonsmokers (P less than 0.01). Women taking oral contraceptives showed higher fibrinolytic activity in blood and saliva (P less than 0.01). Multiple regression analysis revealed that the following independent variables were significant as predictors estimating the postoperative fibrinolytic activity of blood (R2=0.42, P less than 0.001): preoperative fibrinolytic activity, operation time, tobacco consumption and amount of local anesthesia. No relationship was demonstrated between the preoperative fibrinolytic activity in blood and mixed saliva, whereas postoperative fibrinolytic activity in blood significantly influenced the activity in saliva, because of direct contamination from the oral ulcer (P less than 0.05). Patients who developed alveolitis sicca dolorosa (''dry socket'') showed significantly higher fibrinolytic activity in the blood postoperatively (P less than 0.01).
10. Hochwald, D.A., Davis, W.H. and Martinoff, J. *Modified distolingual splitting technique for removal of impacted mandibular third molars: incidence of postoperative sequelae*. Oral Surgery, v. 56, no. 1, July 1983, pp. 9-11.
11. Kraut, R.A. *Transcutaneous oxygen monitoring of patients undergoing surgical removal of wisdom teeth utilizing*

general anesthesia. Anesthesia Progress, v. 29, no. 5, September-October 1982, pp. 132-134.

12. Lindqvist, B. and Thilander, B. *Extraction of third molars in anticipated crowding in the lower jaw*. American Journal of Orthodontics, v. 81, no. 2, February 1982, pp. 130-139.
Abstract: The purpose of this study was to ascertain whether the lower third molar, in combination with other variables such as facial morphology and space conditions can contribute to the occurrence of aggravation of crowding. The subjects consisted of twenty-three boys and twenty-nine girls with impacted third molars on both sides of the mandible. The impacted molar on one side was removed, while the other, nonextracted side was used as a control. Average age at the time of operation was 15.5 years (range, 13 to 19). Close to the operation and annually for at least 3 years afterward, study casts and cephalograms (lateral, frontal and oblique) were taken. The findings indicated that (1) despite analyses of many variables, this study has not been able to predict which patients should react favorably or unfavorably to removal of the third lower molars in cases of anticipated crowding; (2) in cases with severe crowding removal of the molars could be recommended; (3) correct proximal contacts seem to be of importance in keeping the space that is achieved by extraction, while incorrect ones may spoil it.
13. Palmersheim, L.A. and Hamilton, M.K. *Fatal cavernous sinus thrombosis secondary to third molar removal*. Journal of Oral and Maxillofacial Surgery, v. 40, no. 6, June 1982, pp. 371-376.
14. Pollmann, L. and Hildebrandt, G. *Long-term control of swelling after maxillo-facial surgery: a study of circaseptan reactive periodicity*. International Journal of Chronobiology, 8, no. 2, 1982, pp. 105-114.
Abstract: The course of swelling after maxillo-facial surgery was investigated by measuring the distance from the tragus to the pogonium. Postoperative distension does not diminish progressively, but decreases in a circaseptan rhythm. Antiphlogistic agents reduce the extent of the postsurgical swelling, but they also disturb the circaseptan reactive periodicity. This could indicate either an acceleration of the wound healing or a damping down or disturbance of the regeneration mechanisms of the organism. Although this question is of considerable clinical importance, present research has not yet provided an answer.
15. Rood, J.P. *Degrees of injury to the inferior alveolar nerve sustained during the removal of impacted mandibular third molars by the lingual split technique*. British Journal of Oral Surgery, v. 21, no. 2, June 1983, pp. 103-116.
16. Rood, J.P. *Lingual split technique. Damage to inferior alveolar and lingual nerves during removal of impacted mandibular third molars*. British Dental Journal, v. 154, no. 12, June 1983, pp. 402-403.
17. Salman, S. and Salman, L. *The impacted third molar*. New York State Journal of Medicine, v. 82, no. 11, October 1982, pp. 1579-1580.
18. Sametzky, S. *Importance de la pathologie d'évolution de la dent de sagesse inférieure en odontologie du sport*. Le Chirurgien Dentiste de France, v. 52, no. 183-184, December 16-23, 1982, pp. 49-51.
19. Schofield, I.D. and Warren, B.A. *The clinical presentation and pathology of the dry socket syndrome*. International Journal of Oral Surgery, v. 10, Supplement 1, 1981, pp. 107-113.
20. Skjelbred, P. and Lokken, P. *Postoperative pain and inflammatory reaction reduced by injection of a corticosteroid. A controlled trial in bilateral oral surgery*. European Journal of Clinical Pharmacology, v. 21, no. 5, 1982, pp. 391-396.
21. Thijs, L.G. and others. *Life threatening complications from a lower wisdom tooth*. International Journal of Oral Surgery, v. 11, no. 5, October 1982, pp. 310-315.
Abstract: The case history of a 25 year old student who developed a number of very serious complications after a simple extraction of a lower wisdom tooth is presented. A submandibular abscess was followed by septic shock with several thrombocytopenia and transient renal insufficiency, adult respiratory distress syndrome, pneumothorax and pericarditis. From the blood, alpha-hemolytic Streptococci were cultured, while cultures from the abscess grew Bacteroides fragilis. With intensive treatment, including artificial ventilation with PEEP, the patient survived this life-threatening episode.
22. van der Zwan, J. and others. *The lower third molar and antiphlogistics*. International Journal of Oral Surgery, v. 11, no. 6, December 1982, pp. 340-350.

NEW LIBRARY ACQUISITIONS

TITRES EN BIBLIOTHÈQUE

These current acquisitions are available on loan from the Resource Centre/Library.

Ces titres indiqués sont maintenant disponibles à la bibliothèque/centre de documentation de l'ADC.

1. Black, Seymour, editor. *Disinfection, Sterilization and Preservation*. 3rd edition. Philadelphia: Lea & Febiger, 1983. 1053p. 2 copies.
2. *A Directory of Medical Archives in Ontario*, compiled by Margaret Dunn; edited by Mary Baldwin. Toronto: The Hannah Institute for the History of Medicine, 1983. 129p. 1 copy.
3. Mellberg, James R., Ripa, Louis W., and Leske, Gary S. *Fluoride in Preventive Dentistry: Theory and Clinical Applications*. Chicago: Quintessence Publishing Co., 1983. 290p. 1 copy.
4. Myrvik, Quentin N. and Weiser, Russell S. *Fundamentals of Immunology*. 2nd ed. Philadelphia: Lea & Febiger, 1984. 510p. 1 copy.
5. *The Relationship of Intraoral Protective Devices to Athletic Injuries and Athletic Performance*. June 25-26, 1982. W.K. Kellogg Foundation Institute, Graduate and Postgraduate Dentistry. The University of Michigan School of Dentistry. Ann Arbor, Michigan. 1 copy.
6. Wyman, Roel J. *The Posterior Composite Resin Restoration: Winning at Restorative Dentistry Without Mercury*. Toronto: Maxplax, 1983. 109p. 1 copy.

One copy of the above articles is available at no charge from the library to all CDA members. Non-members will be charged $5. This bibliography was generated with the help of MEDLARS, a computerized information retrieval system for the Health Sciences field, which has been operational at the library since February 1982, and is at the disposal of all members.

La bibliothèque de l'ADC offre gratuitement à ses membres et pour $5 aux non membres une copie des articles. Cette bibliographie a été préparée avec l'aide de MEDLARS, un système informatisé de recherche bibliographiques pour les sciences de la santé. Ajouté à la bibliothèque en février 1982, ce système est à la disposition de tous les membres.

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Book Reviews

CHANGING HUMAN BEHAVIOUR – STRATEGIES FOR PREVENTIVE DENTISTRY

Philip Weinstein and Tracey Getz

The C.V. Mosby Company
St. Louis, Missouri, 1979
$9.95, 134 pages

The authors claim that their text is designed to enable any member of the dental profession to successfully design and implement a program to identify undesirable dental health behaviour, and to help patients manage and improve their dental health by altering their behaviour as it relates to dental health habits.

The book is divided into two main sections. The first section outlines six fundamental steps to be followed to arrive at this behavioural change. The second section deals with the management of particular types of dental patients and attempts to deal with the stress these patients often experience.

The six steps the authors outline to reach the goal of behavioural change are reasonably well defined and expressed. They begin by identifying the behaviours that are not desirable and defining those that are desirable. They outline how behavioural change may be accomplished by defining methods of collecting baseline data concerning the behaviour and specifying goals and objectives to be reached. Planning for the behavioural change is discussed using the age-old methods of instruction and modeling techniques with appropriate positive reinforcement. By this approach, the authors hope to change the undesirable behaviour and to replace it with a more desirable one that is also more acceptable to the patient. Various methods are mentioned as they might relate to the dental profession specifically, such as altering the chain of events that leads to poor dental health. Finally, the authors stress the need to monitor the results of the initial plan and the technique used to bring about change and correct when appropriate.

In dealing with children as dental patients the authors propose a guidance cooperation model approach. A number of principles are discussed in relation to this model. The need for special consideration for the elderly is briefly referred to with some emphasis on the dental needs of this group of patients and the difficulties often encountered in providing dental services for them.

In the final chapter of the text anxieties, fears, phobias and pain are considered. Each is dealt with briefly and general methods of coping with each are clearly presented.

The book is appendixed by a brief review of the behavioural change process by chapter and a guideline for selective reinforcement methods. The text is well referenced and indexed.

This book was reviewed by W.J. Fleming, Associate Professor, Faculty of Dentistry, University of Toronto.

THE PHYSIOLOGY OF ORAL RECONSTRUCTION

E. Lloyd DuBrul and Ajax Menekratis

Quintessence Publishing Company
Chicago Ill.
1981, 142 pgs.

The Quintessence Publishing Company has acquired the knack for producing simply splendid books. They are superbly produced with marvellous illustrations. Occasionally the Company even finds authors to match the quality of the publications. The Physiology of Oral Reconstruction is almost one of these books. It is a concise, lucidly written review of some of the basic facets of occlusal reconstruction. It is conveniently divided into two parts. In part I, that marvellous teacher of anatomy, Professor Lloyd DuBrul, takes a mere fifty three pages to "explain (and) not merely to describe" the architecture and structure of the oral or masticatory apparatus. His presentation is a delight to read, clearly stated and as with most of DuBrul's writings, extremely provocative.

The second half of this book tends to pale by comparison. The pictures are several and very pretty, but the text tends to be superficial and too "cookbookish" by comparison to the intellectual tone of Part I. The introduction to Part II features the sub title, A Physiological Approach to Oral Prosthesis. Surely the author meant Prostheses or else to *the* Oral Prosthesis. This lapse made me feel uneasy, and the feeling persisted throughout my perusal of the next seventy seven pages. I found the use of such captions as "left lateral", "bite rims", "pathologic occlusal posture", and "upper anterior bridge that supported a partial" distracting and inelegant. The actual physiology of oral reconstruction is very superficially treated and the reader is left with the lingering regret that he should have only purchased the first half of this book. There is little in Part II which has not been said before, and much better at that. Good pictures alone do not redeem this effort and I do not recommend purchasing this book.

This book was reviewed by George A. Zarb, BChD, DDS, MS, FRCD(C), Professor and Chairman of Prosthodontics, Faculty of Dentistry, University of Toronto.

ATLAS OF ORAL PATHOLOGY

William G. Young and Heddie O. Sedano

University of Minnesota Press
Minneapolis, Minnesota, 1981
$25.00, 223 pages

The reader's immediate reaction on examining this **Atlas of Oral Pathology** is one of surprise at finding no illustrations; however closer investigation reveals the presence of 300 colour transparency case illustrations, stored on five microfiches, placed in a folder inside the back cover of the book. The authors are to be commended for the quality and appropriate selection of these case illustrations, of fundamental importance in any Atlas of this type. However, since a microfiche viewer is needed to view them, the illustrations are not readily accessible and thus inconvenient to use. In my opinion this constitutes a major drawback and may be a deterrent to the average reader. In possession of a viewer, although there still remains an element of inconvenience when compared to the usual colour print incorporated into a book's pages, the trade off is no less than 300 excellent illustrations, particularly well suited to the small seminar group as well as the individual reader.

The purpose of the book is stated in the

reface: "This Atlas is designed to give entists, physicians, and other health pro-ssionals access to a large selection of ases illustrating Oral Pathology and can e used in reviewing clinical Oral Pathology or examinations or in identifying diseases the clinic." Within these parameters the eader is informed in a clear concise style.

A distinctive feature of this Atlas is its yout. There are two main parts, the first omprised of five chapters dealing with athology of the face and neck, mucosa of e vestibule tongue and floor of mouth, ingivae and palate, teeth, and finally the ws. Each chapter, accompanied by a belled microfiche, is divided into three sec-ons, first a series of case histories, second differential diagnosis list for each case and nally the working diagnoses. The second art of the book consists of a short descrip-on of each disease presented in the micro-ches and arranged in alphabetical order.

This organisation allows for a flexible se of the book. Those readers wishing to st their diagnostic expertise may study a clinical history in the first section, along with viewing the corresponding illustrations on the microfiche, draw up their own differential diagnosis and may then compare this with that given in the second section. The most likely final diagnosis is then decided upon and compared with that given in the third section. In this way the diagnostic approach as used in the clinic is simulated, a meaningful educational exercise for the student and a salutary one for the more experienced clinician. One unfortunate omission here is the lack of special test results explaining how the final diagnoses were made, although in several cases this is apparent from the clinical history.

An alternative approach for those wishing to forego these diagnostic exercises, is to refer directly to Part Two of the book, containing short descriptions of the diseases previously exemplified in Part One, and use this as a standard text. However, these descriptions are somewhat abbreviated and without references; if more detailed information is required, one of the larger more definitive Oral Pathology texts should be consulted.

The diseases selected for inclusion in this text have been appropriately made using the following criteria: frequency of occurrence, life threatening potential (as shown by numerous examples of neoplasia and oral manifestations of systemic disease), the most likely clinical appearance and the importance of illustrating diseases of similar appearance.

This book with its numerous illustrations is recommended as an aid to identifying oral disease and is a welcome addition to the educational literature in Oral Pathology. It is eminently suited to the small seminar group and will appeal particularly to the reader who enjoys testing his/her diagnostic expertise.

This book was reviewed by M.J.A. Smith, BDS, FDS, RCPS, Sessional Lecturer, Department of Oral Medicine, University of British Columbia.

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PRESERVATION AND FIXATION OF SKIN FOR ULTERIOR SCIENTIFIC EVALUATION AND COURTROOM PRESENTATION

Dr. Robert B.J. Dorion

ABSTRACT

A nemesis for forensic pathologists and dentists is the preservation of skin as it was in vivo. Bite mark evidence stimulated research in this area and has led to a simple, practical and reliable method for preserving the skin and its underlying tissues.

SOMMAIRE

Pour les pathologistes et les dentistes légaux, il est difficile de préserver la peau des victimes comme elle était de leur vivant. Les preuves de morsure ont stimulé les recherches dans ce domaine et ont conduit à une méthode à la fois simple, pratique et sûre de préserver la peau et les tissus sous-jacents.

MATERIALS AND METHODS

The following materials were used in this study:

1- Acrylic (Hygon$^{T.M.}$ tray material from Hygienic).

2- Cyanoacrylate (Krazy Glue$^{T.M.}$, Avdel Bond 2$^{T.M.}$).

3- Scalpel handle and blade.

4- Varying sizes of sealable plastic containers.

DISCUSSION

The acrylic (powder and methyl methacrylate monomer) is mixed to a doughy consistency. It is then molded and applied to the dry skin in order to form a complete ring around and beyond the specimen to be excised. Care is taken to obtain maximum contact with the skin without applying pressure. The thickness of acrylic should be proportional to the area to be excised, the larger the area to be excised the thicker the acrylic (minimum thickness 2 cm.). The inner edge of the ring should

There is a close adherence of the acrylic ring to the scalp upon excision. Note that the outer edge of the ring is sharp and at 90° to the scalp.

Specimen of thigh bearing a tattoo. Note that curvature of the thigh is maintained.

be at least 2 cm. away from the area of interest. The acrylic should be in intimate contact with the skin and follow all of its convexities and concavities. This is particularly important when preserving parts of the body around the ears, nose, eyes, mouth, digits and penis. A lesser problem exists with larger areas of convexity such as the scalp, legs, buttocks, breasts, etc.

The exothermic reaction produced by the setting acrylic may be slowed by applying a cold wet facecloth to the acrylic. When the acrylic has set, the ring is marked for identification purposes as to its orientation on the corpse (left, right, upper, lower, internal, external, etc.) with indelible ink. In addition, the acrylic and skin are marked at three equidistant positions for future use and identification as reference points. It can then be photographed in relationship to the corpse.

The ring is then gently teased off the skin and the inner and outer borders are "sharpened" with a file or similar instrument in order to obtain maximum contact with the skin. Using the previously described reference points, the ring is deposited back onto the skin and cyanoacrylate is applied along the junction of the acrylic ring and epidermis both inner and outer aspects. The cyanoacrylate will move by capillary action to the underside of the ring. It is left to dry for 5 minutes and the excess is removed with tissue paper.

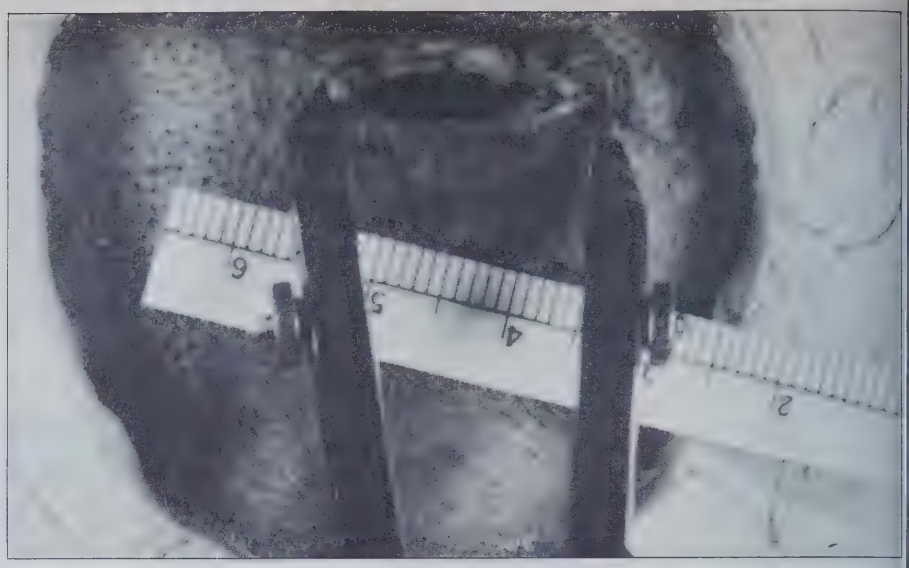
The skin is ready for excission. Ideally the tissue thickness to be excised should measure 4 cm. or more and the incision perpendicular to the epidermis (rather than a wedge incision).

The excised tissue is placed in rigid plastic sealable container which has been marked for identification purposes. The specimen is completely covered in a 40 per cent solution of formaldehyde. It was found that specimens containing little subcutaneous fat and very large specimens needed additional support. This can be obtained with acrylic mesh temporarily placed on the skin prior to excision. In most cases it can be removed after fixation.

The method has been used to preserve the skin with bite mark evidence, tool marks, gunshot and stab wounds as well as tatoos and other epidermal anomalies or trauma.

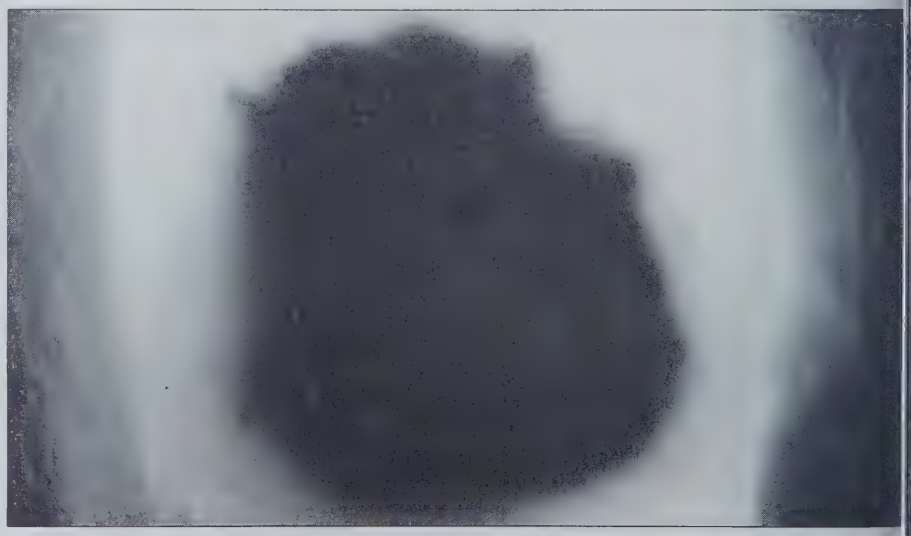
CONCLUSION

A three year ongoing study demonstrated that skin can be excised and preserved as it was in vivo with a minimum of or no post fixation shrinkage. The implications regarding post autopsy scientific evaluation and court presentation are evident.



Specimen of scalp bearing a traumatic wound. The linear measurement is made easier with the use of a compass.

Specimen of a gunshot wound to the chest.



Bite mark evidence one year after excision and fixation. The subcutaneous haemorrhage is seen by transillumination.

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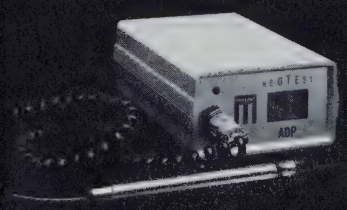

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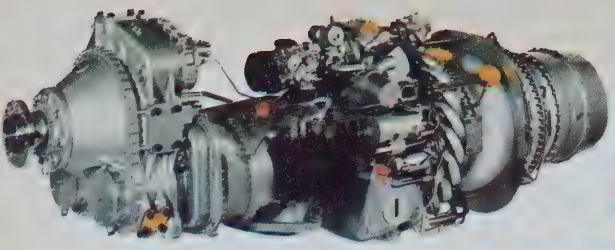

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PRINCIPAL/ASSOCIATE AGREEMENTS

G.R. Thordarson, DMD*
B. Rocky, DDS*
R.J. Orr*

INTRODUCTION

Because the College of Dental Surgeons of B.C. was becoming increasingly aware of disputes which arise between principals and associates upon termination of an associateship, a set of guidelines appeared to be necessary. Accordingly, the College drafted the following. (Please note that the facts are correct for British Columbia but may not apply to other provinces. The general principles expressed should apply however.)

When the disputes occur, generally speaking they stem from three main issues.

1. *The ownership of patients and whether patients may be contacted by the departing associate.*
2. *The winding up of financial responsibilities on the part of the principal to the associate and the associate to the principal.*
3. *The relocation of the former associate's office in an area that the principal feels is excessively close and may interfere with his/her practice.*

The College has a variety of legal opinion developed over the years which generally states that the principal in a practice has "ownership" of the patients in the practice and that the associate, who is probably an employee, has no ownership of patients in the practice. Agreements may be entered into between the principal and the associate with override the above general statement. However, where there is not an agreement then the above statement holds, provided the associate can be shown to be an employee.

Where arguments occur, however, we find the initial negotiations have been on a verbal basis and nothing has ever been written. When the principal and associate embark on their relationship all is sweetness and light and they do not look a year or two or three down the road when a separation will occur. Frequently at that point the principal and associate have opposing views of the statements and understandings that were initially present when they embarked upon their relationship. Because of these disputes that arise all too frequently, the College has developed this set of guidelines to be used by principals and associates and their solicitors.

These guidelines contain a number of topics which both principal and associate should consider and discuss with their lawyer. We strongly suggest that dentists should not draw up their own agreements but that they should have agreements drawn up by their lawyer. What the dentists should do is sit together and consider each of these topics, and perhaps others that are not included, and come to some agreement as to how each issue should be dealt with. If they then make notes surrounding their agreement, they can markedly decrease the amount of legal time involved and therefore the cost in developing a proper associate/principal agreement. To emphasize, the dentist should use the services of a lawyer to draft the agreement. The following material suggests topics which should be considered, but should not be considered as all emcompassing because there may be topics or issues that are peculiar to your circumstances that are not included.

SOMMAIRE

Comme le Collège des chirurgiens dentistes de la Colombie-Britannique avait de plus en plus conscience des disputes qui survenaient entre les principaux et les associés quand cessait une association, il lui a paru nécessaire d'établir des directives. Il a donc préparé celles qui suivent. (Veuillez noter que les faits sont exacts pour la Colombie-Britannique, mais qu'ils ne s'appliquent pas nécessairement aux autres provinces. Les principes généraux restent valables cependant.)

Quand il y a dispute, les causes sont généralement les suivantes:

1. *La propriété des patients et la question que l'on se pose pour savoir si l'associé qui part peut communiquer avec les patients.*
2. *La liquidation des responsabilités financières de la part du principal vis-à-vis de son associé et vice-versa.*
3. *L'établissement du cabinet de l'ancien associé dans une région que le principal juge trop rapprochée de la sienne, ce qui peut nuire à sa pratique.*

Au cours des années, le collège a formulé divers avis légaux qui, en règle générale, veulent que le principal membre d'une association est le "propriétaire" des patients qui visitent un cabinet, et que l'associé, qui est peut-être un employé, n'a aucun droit sous ce rapport. Un associé et son principal peuvent conclure une entente qui nie cette déclaration générale. Toutefois, à défaut d'une entente dans ce sens, la déclaration doit tenir, à la condition que l'on démontre que l'associé a été un employé.

Quand surgit un désaccord, on trouve souvent que les premières négociations ont eu lieu verbalement et que rien n'a été fait par écrit. Lorsque deux personnes forment une association, tout va pour le mieux et personne ne songe à ce qui se produira deux ou trois ans plus tard quand viendra le temps de la séparation. Très souvent, alors, le principal et l'associé diffèrent d'avis touchant les déclarations et les ententes originales. C'est justement à cause des disputes qui surviennent à cette occasion que le collège a élaboré des directives. Les principaux, leurs associés et leur solliciteurs y trouveront leur profit.

Ces directives couvrent divers sujets auxquels le principal et l'associé doivent songer et qu'ils feraient bien de discuter avec leur avocat. On conseille fortement aux dentistes de ne pas rédiger eux-mêmes leurs ententes, mais de recourir au service d'un avocat pour ce faire. Ce que les dentistes qui désirent s'associer devraient faire cependant, c'est d'étudier ensemble chacun des sujets couverts par les directives ainsi que d'autres sujets, afin de parvenir à une entente pour chacun d'eux. S'ils prennent des notes touchant leur entente, ils peuvent réduire de

façon considérable le temps requis par un avocat pour rédiger l'entente définitive et diminuer d'autant le montant des honoraires que celui-ci exigera.

Pour résumer, le dentiste devrait faire appel à un avocat pour rédiger les termes d'une entente. Ce qui suit constitue une liste des sujets à couvrir. Cependant, cette liste n'est pas exhaustive parce qu'il peut y avoir des facteurs qui sont particuliers à certains cas.

DISCUSSION

Where the two dentists are in general agreement to the various points that are to be included and with regard to the substance of the points, it is likely that the principal's lawyer could sit with both sides to draft the agreement or the letter of understanding. Where this occurs it is recommended that the associate have the agreement reviewed by his/her own personal lawyer prior to the final execution of the document.

The agreement, if very simple, may be in the form of a letter in duplicate from the principal to the associate setting out the terms of the associateship and requesting that the associate sign the letter if he/she agrees. Such an agreement is completely enforceable and can be in lay language. The problem in most cases is that the parties forget something and then there is an argument, generally at the time of the termination of the agreement. It is for this reason that we suggest that if you are entering into even a simple relationship you discuss it with a lawyer to help cover all pertinent material.

Perhaps more to be recommended is a formal agreement which would contain some things that may not be included in the above letter of agreement and should once again be drafted in consultation with a lawyer.

Points to consider whether you are using a simple letter format or a formal agreement are as follows:

A GENERAL STATEMENT:

a) the associate warrants and represents that the associate is a member of the College in good standing and is registered;
b) a covenant that the associate will at all times during the term of the agreement hold all licences, certificates or degrees required to practise dentistry;
c) a covenant that the associate will practise in conformity with the Dentists' Act and the Regulations thereunder as well as the Code of Ethics;
d) a covenant that the associate will faithfully render to the patients a full range of dental services;
e) a notice clause;
f) a statement that the agreement is the sole agreement between the parties and can only be modified by a modification agreement in writing signed by both parties;
g) a statement that the agreement does not create a partnership between the principal and the associate.

Term of Agreement: A common term is one year from the date of commencement of services which date should be stated in any agreement. Often the term clause goes on to say that the agreement will automatically be renewed unless a notice of termination in writing is given by either party sixty days prior to the end of the term. This is an important aspect and is required to define appropriate notice between principal and associate as to termination of the agreement.

Termination clause: Termination clauses often contain two terms:

a) may be terminated by either party without cause on ------ days notice;
b) may be terminated forthwith by the principal for cause.

If such a clause is used "cause" should be defined. Often the definition is, "cause includes but is not limited to malpractice, negligence, absence from work for ---- days without permission, breach of the Dentists' Act, the Regulations thereunder, and/or the Code of Ethics."

The College of Dental Surgeons of British Columbia uses these guidelines to help B.C. practitioners with principal/associate agreements in dental practice in that province. According to Dr. G. R. Thordarson, Registrar of the College, British Columbia is one of the only province's in Canada which has a concrete set of guidelines published for this area of practice management. These guidelines are reprinted here for the information of our readers.

The number of days of annual holidays: The holidays paragraph should include some requirement of notice by the associate to the principal as to when the associate wants to take his/her holidays. It should also include mechanisms whereby additional holidays or time off if desired by the associate, over and above the stipulated days or weeks of annual holiday, may be dealt with.

Days and hours of work: This topic requires consideration and may require elaboration as to specific operating rooms to be used in certain hours or on certain days.

A paragraph setting out what the principal will supply: For example, premises, equipment, support staff, laboratory facilities, expendable supplies, etc. The foregoing list is by no means inclusive of all areas that should be considered, but represents some of the more important details. In this connection, something should be said as to whether the associate has any right of approval of the hiring or dismissal of the support staff which he/she will use.

A paragraph stating what the associate will supply: Generally, this is hand surgical instruments but may include other instruments, materials, etc. Commonly, this would become more important where the associate has set ideas on the equipment or materials that he/she may wish to use that do not fit with the principal's practice and should therefore be enumerated.

The number of days of sick leave: Often this includes a clause that if the associate is unable to work for ------ months, the agreement is automatically terminated.

A paragraph regarding compensation: There should be a section in the agreement concerning how dental fees will be dealt with. This should detail what percentage of billings will accrue to the associate and the paragraph should include:

a) what the percentage is – for example, a percentage of the net amount collected or some other agreed upon division;
b) when this sum will be paid – generally, the percentage of fees involved would be paid to the associate on a monthly basis.

The types of agreements that are developed vary widely, some of them being based on gross production or billings, some being based on net collections. Each is different, depending on various other negotiated issues such as equipment or supplies provided by the principal and many other possible negotiated items.

How final payments are to be handled on termination of the agreement should be clearly defined. If holdbacks are to occur they should be dealt with in the agreement.

Patients' accounts: A section should be included on how patients' accounts are to be handled and who will be responsible for collection of them. Included in this statement should be some agreement as to how billing of third parties is to occur. For example, if the money is all to be paid to the principal under the agreement, many of the third party carriers will issue a payment number so that while the associate actually completes a card under his/her name, the payment will be sent to the principal. It is important that this division occur since the associate is responsible for the care that he/she renders, and the appropriateness of the billing, and it is better for

the principal's and associate's billings to be separated in case some question arises.

Laboratory fees: There should be a section discussing laboratory fees with regards to who pays them and when they are to be dealt with. This is another negotiated item which needs to be considered along with the percentage of income due the associate as it may vary from a 100 per cent payment of laboratory fees by the principal to a 100 per cent payment of laboratory fees by the associate and obviously either one or the other of these would have a major effect on the percentage of the billings due to the associate.

Records to be kept by the associate: This topic should be addressed in terms of whether the associate is willing to use similar records to the principal in the office or whether he/she wishes a substantially different form of record keeping. The principal should ensure that the records kept meet the level required by the office. It is important to the principal since when the associate leaves, these records remain in the office as part of the permanent records of the principal and should at least meet the requirements of the principal for legal protection. Also, the patient who is transferred from associate to associate deserves to have a full and adequate record so that new associates might understand the details of any treatment rendered by former associates or the principal practitioner.

Free services: There should be some mention made with regard to what, if any, free services the associate may perform. Generally, this is limited to free service to the immediate family of the associate and sets out that the immediate relative must pay for laboratory fees. This type of provision will vary widely from office to office.

Probably this paragraph of the agreement should also cover the matter of services to relatives when they are covered by an insurance program.

Annual licence fees: Consideration should be given as to who pays such things as the annual licence fee, malpractice insurance premiums, component society dues, and continuing education fees. It would be common that the associate would pay all of these on his/her own, but in any event it should be specified as to how these various issues are to be dealt with. There may in some circumstances be reasons why the principal may wish to pay some or all of the above or other items not included in the above.

Responsibility to supply patients: There should be a section covering the responsibility, if any, of the principal to supply patients to the associate. Agreements will vary widely in this area as to the degree of responsibility, if undertaken by the principal. Details as to how full the days must be, the weeks must be, etc. should be addressed if any responsibility is to be assumed.

Also to be considered is the range of dental treatment to be provided by the associate or special interest of the principal or associate regarding certain types of dental treatment. For example, the principal may decide that he/she wishes to do all of the crown and bridge treatment in the office and if so this type of stipulation should be considered in the agreement. Similarly, the associate may wish to carry out all endodontic treatment due to particular interests and such an agreement should be noted.

Consideration should also be given as to how new patients entering the office are to be dealt with. Are all new patients to be seen by the associate or are they to be shared between the principal and the associate or some other arrangement? The various possibilities should be considered and a statement made to cover this particular part of office procedure.

Referrals out of the office should also be contemplated. Is the associate to refer to specific specialists for specific care, or refer to the specialist that the associate chooses to use? If the principal has concerns regarding referral out to specialists as he/she likes to carry out certain specialty type procedures, then this should be considered and a general acceptance and agreement arrived at between the principal and the associate so that the associate is comfortable with referring specialty type treatment to the principal.

Ownership of patient lists: This is a very frequent cause for dispute and invariably arises on termination. As previously stated, the associate is probably an employee and as such has no patients. Frequently the associate on termination thinks that patients who have never been treated by the principal should be his/her patients, and that the associate should have the right to send a notice to the patients informing them that he/she is setting up practice elsewhere, etc. Unless there is an agreement to the contrary, the associate does not have the right to contact any of the patients, or to set out to inform patients verbally of the impending move. This is a very important section and should be clearly thought through in the negotiation between the principal and the associate and then stated clearly in writing as to what the understanding is.

It is essential that the matter of patient lists and notification of patients regarding the associates moving be covered in any agreement.

One of the more reasonable terms that has been used is the covenant by the principal that he/she will send a notice to all patients that have been treated by only the associate, telling them that the associate has moved and giving his/her new address and telephone number and informing the patient that he/she may obtain required dental treatment from the associate or continue to receive treatment from the principal's office. If such a term is included, it should also state that the associate has the right to take copies of the patient records where such a notice has been sent. The preceding is merely an example of a type of agreement and should not be interpreted as being a recommended form of agreement. Once again, this is an area that will vary widely depending upon the geographic location of a practice and many other details to be worked out between the principal and the associate prior to commencement of practice together.

Income Tax: Although the associate is at law an employee of the principal, the normal arrangement is that the associate pays his/her own income tax. If the associate does not pay the tax, there is a possibility that the Department of Revenue could approach the principal for any delinquent taxes. Our legal advisors do not feel that this is anything more than a possibility, but do suggest that any agreement should contain not only a covenant that the associate will pay the tax, but also a covenant that the associate will indemnify the principal for any claim arising from failure of the associate to pay his income taxes. Often such a clause includes an agreement that the associate will indemnify the principal for any liabilities, claims, etc. arising from not only claims of income tax, but breach of the agreement, damages to property, negligence and injury to an invitee.

Restrictive covenants: Most principals wish to include a covenant by the associate that he/she will not practise within (specified distance) of the principal's office for (number) years upon termination of the agreement. Unless this is agreed to prior to embarking upon a principal/associate relationship and included in an agreement, it would not be enforceable. Where restrictive covenants concerning practice following dissolution of the agreement are entered into, the restriction must not be so onerous that it would not be enforced by the courts. To be enforceable, the restrictive covenant must be reasonable in so far as the parties are concerned and even more important, reasonable in so far as the public interest is concerned. Sometimes the courts will say the covenant is not enforceable. Other times they will amend the covenant to something that is reasonable and enforceable. Unfortunately, it is impossible to state categorically whether a given restrictive covenant

is or is not enforceable. For example, a restrictive covenant stating that the associate would not practise for one year within one mile of the principal's office, would probably be enforceable in Vancouver, but certainly would not be enforceable in a small town. A restrictive covenant which has a term longer than two years would likely not be enforceable anywhere in British Columbia.

An associate who executes an agreement containing an unenforceable restrictive covenant is placed in a very difficult position. If after termination he/she either ignores the unenforceable restrictive covenant or seeks a declaration in the courts that it is an unenforceable restrictive covenant, the associate may well be on solid legal grounds, but be guilty of infamous or unprofessional conduct from a professional viewpoint if he/she breaches the covenant, for the associate executed the agreement voluntarily. On the other hand, the courts do take into consideration that a restrictive covenant given by an employee is given under some duress and they may be reluctant to prohibit an employee from practising his/her profession even within a limited geographic area for a limited period of time.

Restrictive covenants should consider whether there is a valid reason to justify the restriction. The protection of goodwill may be a valid reason. A restrictive covenant entered into by the principal's management company with an associate may not be enforceable and this should be taken into account in the drafting of any restrictive covenant. The covenant must be reasonable as to time, area and scope, and these three topics should be addressed in any covenant. In terms of the latter topic, the restrictions should not be more extensive than what is required to protect the practice. For example, an associate in a periodontic practice should not be restricted from practising general dentistry. Also, non-solicitation clauses might be included in restrictive covenants as the courts tend to enforce non-solicitation clauses, although they are reluctant to restrict competition per se. The agreement then should possibly contain both a non-competition covenant and a non-solicitation covenant.

In some jurisdictions restrictive covenants in agreements between professionals are illegal. They are not illegal in British Columbia and it is suggested that both the principal and associate obtain legal advice as to the reasonableness of such a covenant before its execution.

Provision for partnership: You may wish to give some thought as to whether future partnership or purchase of a portion of the practice should be contemplated and included in the agreement. This is a very complex area and if it is to be included will likely require considerable legal advice.

Death and/or retirement: You may wish to consider a section in the agreement as to what will occur if the principal in the practice dies or retires while the associate is still involved with the practice.

Negotiations over a period of time following the death of the principal can result in the practice and its value being lost as patients go to other dentists. Some general valuation formula could be considered and included. As in partnership, this is a complex area and a great deal of legal advice may be required.

One further point should be made with regard to the business arrangements entered into between principals and their associates. As a result of the ever-increasingly creative tax planning arrangements that are developed, principals and associates sometimes enter into arrangements which are so structured as to enable the associate to argue that he/she is self-employed for tax purposes, thus permitting the associate to maximize deductions and obtain a deferral of tax by, for example, choosing a year-end for the practice. Also, principals may find utilization of management companies and other tax planning arrangements to their advantage. The point is that an agreement entered into with the associate that characterizes the associate as being self-employed, as opposed to being an employee, may significantly muddy the waters when it comes to a definition, several years down the road, of whether the practitioner was truly an associate or was a self-employed practitioner merely renting space and equipment. The latter issues will require a determination by the courts at considerable cost to both parties involved and so should be contemplated prior to entering into any agreement. Obviously legal advice is once again important to see that creative tax planning does not create a situation where the courts may hold that the principal did not have an associate but merely had an independent self-employed practitioner who was renting space and sharing various facilities. There is a profound effect on ownership of patients depending on whether the individual is classified as an associate or as an independent practitioner under the Code of Ethics and before the courts. Basically, if the individual is classified as an independent practitioner he/she likely "owns" all the patients seen. Consider this carefully.

This material is not, as previously stated, meant to be an all-encompassing document. Every principal and associate agreement may have nuances that are not contemplated by this particular set of points. It has been our experience however that had the preceding points been addressed and properly set forth in a legally constructed agreement most of the arguments we have seen between principals and associates would not have occurred.

Dr. Thordarson *is the Registrar at the College of Dental Surgeons of B.C.*
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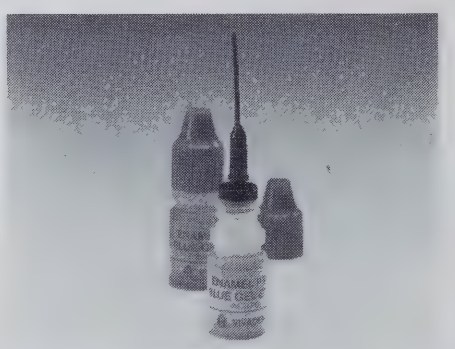

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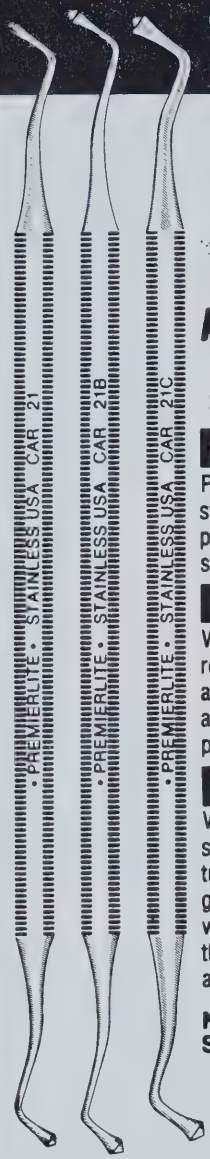

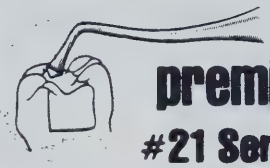

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A FIVE-YEAR RETROSPECTIVE

N. Levine* S. Chima**

1. Original Mobile Home

INTRODUCTION

The provision of dental care for the disabled living in the community has been a source of ongoing concern for a variety of reasons. Manpower,[1-5] access – both physical and geographic – to dental offices,[1,2,3,5] a lack of exposure to the handicapped during one's undergraduate dental education programme,[12,19,23] financial resources and parental priorities,[21] to mention only a few, have all been contributing factors.

The United Nations declared 1981 the International Year of Disabled Persons, and in so doing brought into focus the many problems faced by this segment of society. Above all, it sought to eliminate all possible barriers which would interfere with the integration and normalization processes,[5,7] and hence give the disabled person an opportunity to assume a more public and productive role in society, and live a life of greater self-worth and dignity.

In 1977 the Atkinson Charitable Foundation in Toronto, as part of their contribution to the University of Toronto Sesquicentennial Update Programme, awarded a grant of $284,000 to the Faculty of Dentistry for the development of a mobile trailer to provide dental services to the disabled in more distant areas of Ontario. The programme was to extend for a five-year period, serving as a satellite clinic of the Faculty, with a service, educational and research component. In addition, through its presence, it would create a public awareness for the dental needs of the disabled in the community, as well as in various professional organizations within the area. Although referred to as a "mobile", the trailer is moved to a central area and made stationary for a minimum of one year, before being moved to another area where there has been a demonstrated need.[5] For the first two years of operation a trailer on loan from the Ontario Government's Ministry of Health was used.

ARTICLE SOMMAIRE

La prestation des soins dentaires aux handicapés est une source de soucis constants pour diverses raisons. Parmi ces soucis, il convient de mentionner les ressources en personnel[1-5], l'accès aux cabinets dentaires (physique et géographique)[1,2,3,5], les programmes de formation dentaire qui ne préparent pas suffisamment l'étudiant à traiter les handicapés[12,19,23], les ressources financières et les priorités de parents[21].

En déclatant 1981 l'année internationale des handicapés, l'ONU a attiré l'attention sur les nombreux problèmes auxquels fait face cette partie de la population. Par-dessus tout, on a voulu éliminer tous les obstacles possibles s'opposant aux procédés d'intégration et de normalisation afin de donner aux handicapés une occasion de jouer dans la société un rôle plus productif et moins privé, et d'avoir une vie remplie de dignité dont ils soient fiers.

2. Dental operatory — single chair

3. Exterior view showing access ramp

3a. Furnished living quarters

MOBILE DESIGN

The basic framework for the mobile trailer was a 12'×60' mobile home **(Fig. 1)**. This was modified to provide for complete living quarters for the resident dentist, as well as all the facilities essential for a single complete and fully furnished dental operatory **(Fig. 2)**. It was particularly well insulated to allow protection from the extreme summer heat and winter cold. Several modifications for easy access via ramps and wider doors to accommodate wheelchairs were incorporated[2,6,7,24] **(Fig. 3)**.

STAFF

The mobile is staffed year round by three Faculty of Dentistry interns on a four-month rotation for two-month periods. There is a full time dental assistant/receptionist, and in addition, ten senior dental students on a selective/elective basis are assigned for two-week periods. When appropriate, students in dental hygiene and assistant programmes rotate through the clinic as part of their training at a Community College located in the area of the mobile clinic.

PATIENT PROCUREMENT

The need for dental treatment for mentally retarded and physically handicapped persons in northern communities was substantiated in the report by Levine.[5] Invitations to locate the mobile in the communities of North Bay initially, and subsequently Sudbury, new Liskeard and Temiskaming, were received. There was complete cooperation with existing agencies already involved in servicing the disabled, and hence in each of the areas patient flow was generally not perceived as a problem.

DENTAL TREATMENT

Because some of the persons have never been to a dental practitioner, the following steps are used as a general guide in the sequencing of dental treatment:

1. Screening and assessment – introduction of the clinic to parents and/or other persons accompanying the patient; history taking and medical consultation, where necessary.

2. Where patient management seems to be a problem, behaviour modification procedures are initiated.

3. Complete clinical examination and radiographs, diagnosis and treatment plan.

4. Preventive dental education for patient and accompanying persons where necessary, and re-enforced throughout treatment and include recalls.

5. All phases of oral treatment.

While concern for elimination of pain and restoration of the oral cavity to a healthy dentition was a major objective, the preventative aspects of ongoing dental care were emphasized as being of primary importance. Tables 1 to 4 summarize in part the data collected over the four years during which treatment was rendered. During the period of May 1980 to August 1981 the University of Toronto's Faculty of Dentistry's own mobile was constructed.

CONCLUSION

The concept of delivery of dental care to the disabled from a specifically designed mobile dental clinic, while at the same time serving as a teaching clinic giving exposure to students in dentistry, dental hygiene and dental assisting, is a unique approach in providing dental treatment to the disabled in communities of Northern Ontario.

Inaccessibility to dental offices has been a major problem and even in this case patients had to travel as far as 340 km to New Liskeard when the mobile was stationed there. It is for this reason that the mobile moves on an annual or bienniel basis to other communities to render total patient care rather then emergency service.[1,5,11]

In general, the dental health of persons under the age of twenty was found to be poor, reflecting not just the degree of mental or physical disability, but also the lack of home care, both in institutional and non-institutional persons.[12,13]

Equally disappointing was the lack of knowledge regarding the prevention of oral disease in the most simple of concepts. Dental health education for parents, health care members and the disabled must continue to be a priority in this project if the ratio of restorations and extractions as well as periodontal problems is to be improved **(Fig. 4, 5, 6)**.

Although patient management was a problem, less than 5 per cent of all patients examined required a general anaesthetic for completion of treatment. This is most encouraging and credit should be given to the team of the dentist, dental assistant, parent or health-care worker for their role in the behaviour modification of the unmanageable patient. Oral sedation was used very sparingly and if not successful in improving behaviour, was discontinued in favour of the use of a general anaesthetic.

In all the communities involved, the presence of the mobile, we believe, created an awareness for the need of better dental health for all categories of disabled persons. It is a challenge to the entire community to assure that this need is met through support from all levels of society, and thus provide for the disabled to be better integrated into society or at least live in better health and greater comfort and self-esteem.

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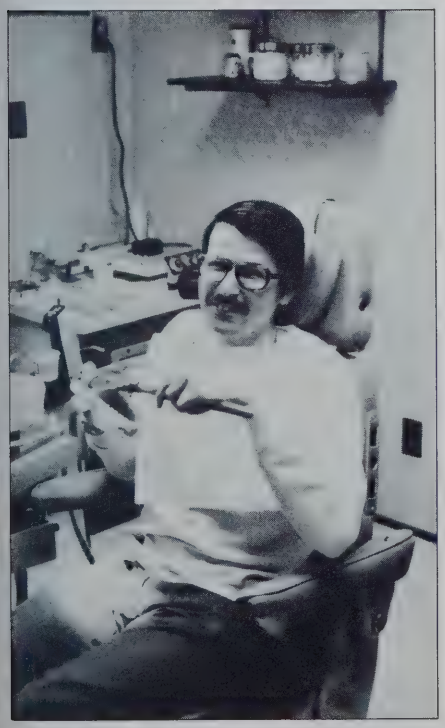

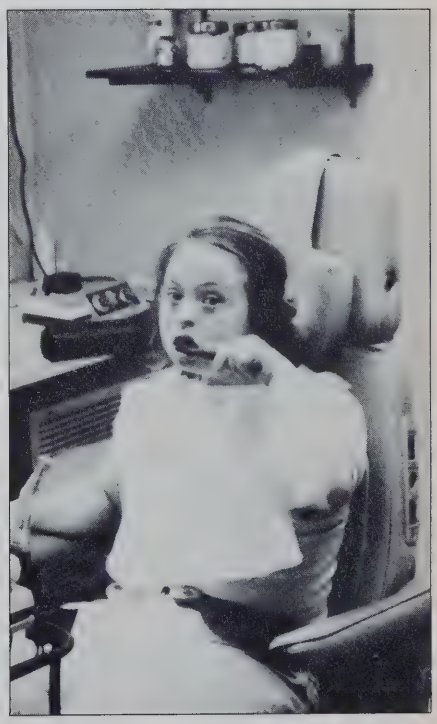

4, 5 and 6. Teaching oral hygiene to disabled persons of all ages

TABLE 1

Patient load overview for each district since patients came from neighbouring towns

SITE	Population	Time of review	No. of Patients	No. of Appt's	No. of Pat Completed	Recall Visits
North Bay*	73,850	Nov. '78-June '79	216	820	156	20
Sudbury*	176,442	Aug. '79-May '80	187	627	140	30
New Liskeard*	37,316	Aug. '81-May '82	169	895	120	35
South Porcupine*	86,308	July '82-Apr. '83	204	874	179	51
Total	**373,916**		**776**	**3216**	**595**	**136**

TABLE 2

Classification of Patients Attending the Clinic

SITE	Mentally Retarded	Physically Handicapp.	Down's Syndrome	Cerebral Palsy	Socially Handicapp.	Learn. Disab.	Total
North Bay*	43	22	8	4	131	8	216
Sudbury*	95	65	10	17	–	–	187
New Liskeard*	51	61	15	3	8	31	169
South Porcupine*	91	70	17	10	11	5	204
Total	**269**	**208**	**47**	**34**	**150**	**44**	**776**

TABLE 3

Treatment procedures provided

SITE	Total No. of Pat	Tot. No. of Appt	Init. Exam	Restor.	Extractions	SS/PC Crown	Endodont.	Period. Prevent.	Prosthod.	Recall
North Bay*	216	820	216	855	166	31	36	213	***	20
Sudbury*	187	627	187	482	311	**	37	184	***	30
New Liskeard*	169	895	169	655	276	**	25	138	6	35
South Porcupine*	204	874	204	516	140	**	5	203	13	51
Total	**776**	**3216**	**776**	**2508**	**893**	**31**	**103**	**738**	**19**	**136**

TABLE 4

Number of Patients that required a GA for dental treatment because of management or medical complications

SITE	Total No. of Pat.	G.A. Required	%
North Bay*	216	–	*
Sudbury*	187	13	6.9
New Liskeard*	169	9	5.3
South Porcupine*	204	15	7.3
Total	**776**	**37**	**4.8**

* North Bay: Nipissing District including North Bay
Sudbury: Regional Municipality of Sudbury and Sudbury District
New Liskaerd: District of Temiskaming including New Liskaerd
South Porcupine: District of Cochrane including Greater Timmins and South Porcupine

** Fewer children seen in Sudbury, New Liskaerd and South Porcupine, hence no SSC or PCC.

*** All prosthodontics referred to private practitioners.

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A SURVEY OF DENTAL KNOWLEDGE, ATTITUDES AND BEHAVIOR OF EXPECTANT PARENTS

A. John Lee, DDS, MPH
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ABSTRACT

Expectant parents, who attended the pre-natal series conducted by the Vancouver Health Department, were surveyed regarding their dental health knowledge, attitudes and behavior. 374 questionnaires were completed, 240 by women and 134 by men. Results of the survey indicated that the women consistently exhibited a more preventively oriented pattern of dental behaviour than did the men. Both the women and men reported acceptable toothbrushing practices and reasonably routine histories of dental visits. However, both women and men reported very poor flossing routines.

Questions concerning the infant revealed a great lack of correct information on fluoride and on the importance of the primary dentition. The overall results of the survey indicated the great potential for pre-natal classes for informing the expectant parents about their new infants' dental health, as well as their own.

INTRODUCTION

The Vancouver Health Department has recently introduced a two-part dental component to its prenatal classes. It did so recognizing that this is a critical time to impact positively upon dental health habits of individual families. It is during this time that parents are most interested in learning how to insure a healthy development for the new infant. It is also a time when mothers are very interested in their own health. The importance of this period has been recognized by several authors including Seward[1], Sunberg[2], Goins[3] and Cheyney[4], each of whom has described the opportunity for dental health education during pregnancy. Sanger[5] also has outlined his preventive dental program to include parent education and maternal diet discussion during pregnancy. Likewise, a recent report by Schwenger[6] called for the Health Department, City of Toronto, to direct more dental public health programs to expectant parents.

As part of the evaluation process of the pre-natal dental programs, a self-administered questionnaire was developed to determine dental knowledge, attitudes and behavior of expectant parents prior to their exposure to the dental sessions. This paper will report on the results of that survey.

METHODS AND POPULATION

A self-administered, fixed alternative questionnaire was developed and pretested on a group of 25 expectant parents. This testing allowed for refinement of the questions in order to facilitate answering. The final questionnaire contained 36 questions for the expectant mother and 33 questions for the expectant father.

The questionnaire was administered to all expectant parents attending the complete pre-natal series as offered by two health units within the City of Vancouver. The questionnaire was administered during a pre-natal class and husband and wife were separated while answering the questionnaires. A total of 374 questionnaires were completed by 240 expectant mothers and 134 expectant fathers. The age of the women ranged from 17 to 45 years (mean 25.8 years), while mens' ages ranged from 19 to 37 years (mean 31.7 years). The education level for the females ranged from Grade 8 completed to completion beyond the Baccalaureate level with a mean of Grade 12 completed. For the males it ranged from Grade 4 completed to completion beyond the Baccalaureate level with a mean of Grade 12 completed. 54.7 per cent of the females stated Canada as country of birth, 28.2 per cent listed an Asian country, 6.8 per cent listed Continental European countries, 5.1 per cent listed other countries. Among the males 56.7 per cent listed Canada, 22.4 per cent listed Asian countries, 11.9 per cent listed Continental European countries, 3.0 per cent listed the United Kingdom and 6.0 per cent listed other countries of origin.

RESULTS

1) Knowledge and Attitudes

The overall dental knowledge and attitudes reflected the limited impact of dental health education upon the public. The concept of prevention of dental disease and how to effect it has successfully been imparted to the overwhelming majority of adults. However, this is not the case regarding fluoride and, to a lesser degree, the primary dentition. Specifically, 90 per cent of the expectant mothers and 88 per cent of the expectant fathers believed that tooth decay can be prevented. This compares favourably with another Canadian survey by Epstein[7] which showed that 91 per cent of those queried believed that the prevention of decay was possible, a survey of English adults by Vogan[8] which found that 92 per cent believed it was possible and an Australian study by Chapman[9] of expectant mothers which showed that 88 per cent believed prevention of tooth decay was possible.

Our survey found that 79 per cent of the expectant mothers and 84 per cent of the expectant fathers thought that the prevention of gum disease was possible. Epstein[7] found that 93 per cent of the Canadians in his study believed so, Chapman[9] reported 78 per cent of the expectant mothers in his study believed it possible, while Vogan[8] reported that only 53 per cent of English adults believed gum disease could be prevented.

When asked about the importance of the primary dentition, 21 per cent of the females and 37 per cent of the males in our survey either felt that they were less important than the permanent teeth or did not know. In other words 27 per cent of these expectant parents did not understand the importance of the primary teeth to their children.

Fluorides proved to be the most confusing issue to the expectant parents. While 73 per cent of the expectant mothers and 64 per cent of the expectant fathers thought fluoride would improve the teeth of the children, only 23 per cent of the women and 12 per cent of the men knew that fluoride supplements should be administered once a day. Another important fact was that only 37 per cent of the women and

40 per cent of the men knew that the city of Vancouver did not have fluoridated drinking water. Finally, only 55 per cent of the women and 42 per cent of the men reported that they intended to give fluoride supplements to their new babies. Nearly as many women, 37 per cent and more men, 51 per cent, reported that they just did not know. This is consistent with the general lack of correct information on the topic.

2) Behavior

Again, the questionnaire indicated the limited impact that dental education has had upon the public. 79 per cent of the females and 54 per cent of the males reported brushing two or more times daily. This is similar to a 1968 report by Cohen[10], which stated that 74 per cent of American females and 45 per cent of American males reported brushing two or more times per day. Chapmen[9], found that among expectant Australian females, 74.6 per cent reported cleaning their teeth at least twice a day. Yet, when the expectant parents in our survey were asked about flossing, only 39 per cent of the women and 21 per cent of the men reported that they flossed at least once a day. Indeed, 19 per cent of the women and 24 per cent of the men claimed that they never flossed.

The majority of the expectant parents, 68 per cent of the women and 60 per cent of the men reported a dental visit within the last year. And 64 per cent of both the women and men reported that less than a year had expired between their last dental visit and the visit prior to that. These percentages approximate the percentages of women and men who reported having a family dentist, 67 per cent and 70 per cent respectively. Cohen[11] reported that 51 per cent of American females and 44 per cent of American males surveyed claimed they had visited a dentist within one year.

Biro[12] in a survey of Australian teenagers and adults found that 74 per cent of the females and 61 per cent of the males reported a visit within a year, although Chapman[9] found in his study of expectant Australian mothers that only 27.3 per cent had attended within a year.

When the expectant mothers in our survey were asked the reason for their last dental visit, preventive reasons comprised 57 per cent of all the reported answers, while preventive reasons comprised 51 per cent of the answers of the fathers. Cohen[11] reported on American survey showing preventive reasons accounting for 32 per cent of the most recent visits. In his Australian study, Chapman[9] found preventive reasons accounting for only 28.7 per cent of the most recent dental visits made by expectant mothers.

3) Intended Behavior

When queried about visiting the dentist during pregnancy, 53 per cent of the expectant mothers reported an intention to do so. Among the 47 per cent who did not plan to visit, several cited radiation hazards to the fetus as their reason. Other reasons cited included harm to the fetus by the anesthetic, discomfort or pain to themselves.

When asked about caring for the infants' primary teeth, 85 per cent of the expectant mothers reported that they intended to do so, while only 66 per cent of fathers indicated their intention to do so. This lower percentage among fathers corresponds with the greater percentage of fathers who either felt the primary teeth were less important than the permanent teeth or did not know. This probably also reflects expected parental roles in the North American society (i.e. – the mother is the one responsible for the infant's health needs). In response to a similar question Edwards[13] found that among English primagravid women, only 71 per cent would be cleaning their children's teeth.

SUMMARY

The results of this questionnaire serve to underline several important points. First, the level of dental health knowledge is greater among women than men. More importantly, women report a pattern of dental health behaviour that is consistently more preventive than men. In terms of prenatal dental sessions the importance of this is obvious if one assumes it is the mother who will be home with the new infant. Thus, our efforts to develop preventive dental health behavior for the infant should be directed primarily at the mother, even though both parents attend the pre-natal sessions.

It is also obvious that the information in these sessions should emphasize the importance of fluoride and attempt to resolve the confusion surrounding this issue. Likewise, the importance of the primary dentition must be stressed. In terms of parents, emphasis should be placed on the role of flossing in achieving and maintaining dental health. Despite the fact that over 60 per cent of the expectant parents reported routine dental visits, and 77 per cent believed that flossing is as important or more so to dental health than toothbrushing, only 32 per cent reported flossing at least once a day. Thus, the pre-natal sessions offer another opportunity to encourage expectant parents to include this activity in their routine dental care. Finally, a discussion of the value of the expectant mother visiting the dentist's office after the first trimester should be incorporated into any pre-natal session. This must include information on the precautions taken during such a visit as well as discussion on the importance of dental health to the overall health of the expectant mother.

ACKNOWLEDGMENT

I would like to express my gratitude to the Pre-natal Nurses at North Health Unit and East Health Unit, Vancouver Health Department, for their patience and cooperation in administering these questionnaires over the past year.

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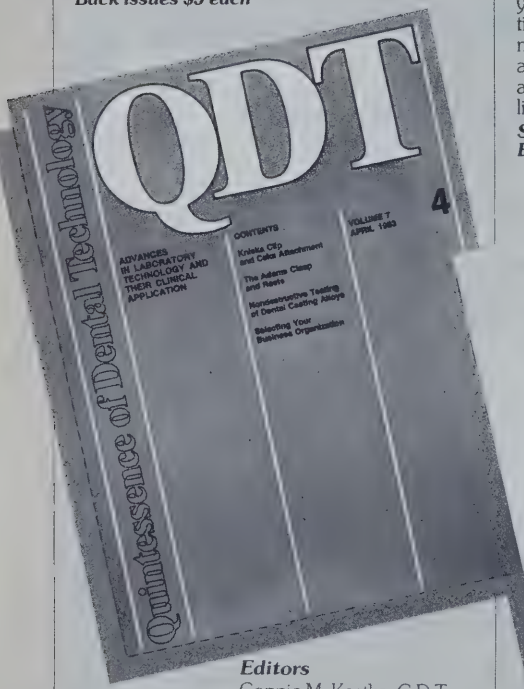

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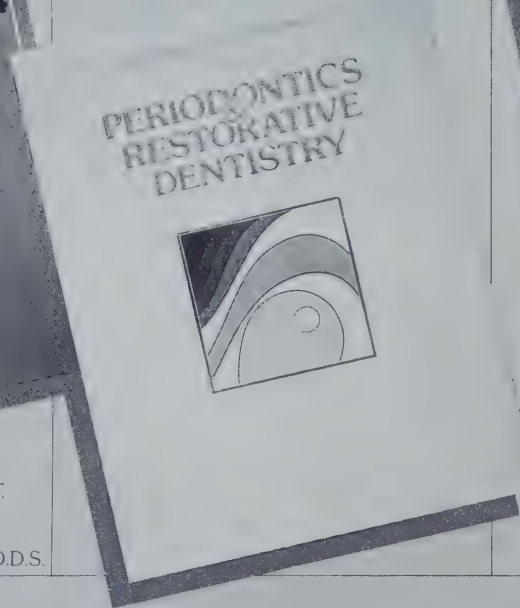

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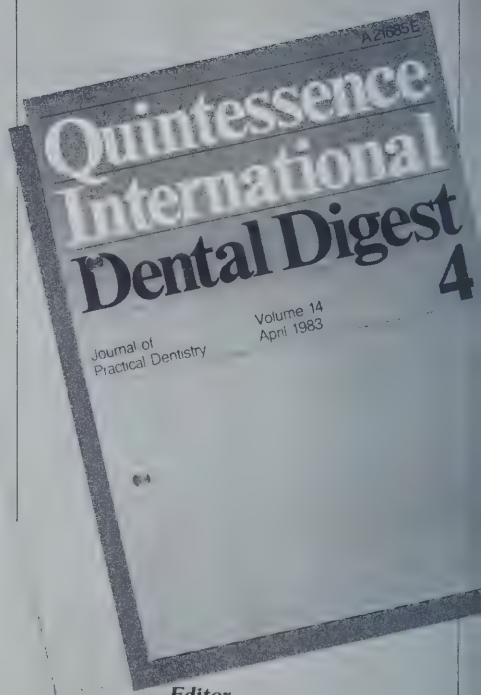

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SYMPOSIUM 25

"Will Basic Research Influence Clinical Dentistry in the Future?"

Symposium 25 was arranged to celebrate the 25th Anniversary of the Faculty of Dentistry at the University of Manitoba in Winnipeg. The two-day Symposium was held in Winnipeg on November 18 and 19th, 1983, and was concerned with the future impact of both basic and clinical research on the treatment, management and prevention of dental caries and periodontal disease.

The Organizing Committee asked a group of 15 dental researchers of international reputation to summarize the present status of their disciplines and to project the future impact of their work on the practise of dentistry, particularly with respect to the two major dental diseases, dental caries and periodontal disease. One of the major problems in dentistry today is the lack of communication between the dental researcher and the practising dentist, such that new scientific information on treatment and prevention of oral disease does not result in alteration in the mode of practise. Symposium 25 was organized to attempt to bridge this gap.

Fifteen papers on dental caries and periodontal diseases were presented at the symposium. The Journal is committed to publishing all 15 of these papers, in their entirety, as a service to our readers. Beginning in this issue, with three of the eight papers presented on caries research, the Journal will be publishing all of the fifteen papers presented.

SYMPOSIUM 25

La recherche fondamentale va-t-elle influencer l'avenir de la dentisterie clinique?

Symposium 25 a été organisé pour marquer le 25ième anniversaire de la Faculté de dentisterie de l'Université du Manitoba à Winnipeg. Ce Symposium de deux jours a eu lieu les 18 et 19 novembre 1983 à Winnipeg, et traitait des effets futurs de la recherche clinique et de la recherche fondamentale sur le traitement, la gestion et la prévention de la carie dentaire et de la paradontolyse.

Le Comité organisateur a demandé à un groupe de 15 chercheurs dentaires de réputation internationale de résumer l'état actuel de leurs disciplines et de prévoir les effets futurs de leurs travaux sur l'exercice de la dentisterie, en particulier sur les deux maladies dentaires les plus importantes, la carie dentaire et la paradontolyse. L'un des problèmes actuels majeurs de la dentisterie est l'absence de communications entre les chercheurs dentaires et les dentistes praticiens, avec pour conséquence que les renseignements scientifiques sur le traitement et la prévention des maladies buccales ne se traduisent pas par des changements de méthodes sur le plan pratique. L'objectif de Symposium 25 était de tenter de combler ce fossé.

Quinze conférences sur la carie dentaire et la paradontolyse ont été présentées à ce Symposium. Le Journal a pris l'engagement de publier le texte intégral de ces 15 conférences, à titre de service à nos lecteurs. À partir du présent numéro, dans lequel il y a trois des huit conférences sur les recherches dans le domaine des caries, le Journal publiera le texte intégral des quinze conférences présentées.

INTRODUCTION

Need for a Rational Approach to Caries Prevention

New hope of controlling dental decay has been raised by the fall in the incidence in caries which has occurred during the last ten years or so throughout the industrially developed world. The reasons for this fall are not clear[1]. It might have been brought about by decreased sugar consumption, general changes in dietary habits, the effect of dental health programmes, a generally increased awareness of dental hygiene, an increased use of fluoride, or a general change in the oral flora, encouraged perhaps by the extensive administration of wide-spectrum antibiotics.

We cannot be sure whether this beneficial trend in the incidence of dental caries will persist or, if it continues, whether analogous changes in other dental conditions might eventually be associated with it. To help ensure that the improvement does continue, we must first of all determine *why* it is happening. Only by careful research and then by putting findings of this research with equal care into dental practice, can we hope to bring caries, and perhaps dental disease in general, firmly under control. The best use has not always been made of research findings, however. There is sometimes a gulf of communication between the laboratory and the clinic.

This is perhaps one reason why progress in the dental field has been relatively slow compared with certain other areas of scientific enterprise; which touches directly on the main theme of 'Symposium 25'.

I would like to illustrate some of these points by discussing the use of fluoride as a means of increasing tooth resistance to dental caries. This is a field with which the authors of this paper are most familiar and I think it illustrates well our occasional failure to pursue a rational course of action in preventive dentistry.

DISCUSSION

The Empirical Approach

Fluoride is overridingly the most effective anti-caries agent. It can act systemically while the teeth are unerupted and topically when it comes into contact with the erupted tooth. After the dramatic discovery by Dean[2] that individuals ingesting a certain level of fluoride in their drinking water had a very low caries incidence, and the later evidence of Bibby[3] that carious attack could be inhibited simply by applying fluoride to the tooth surface, it has proved very tempting to proceed in an empirical fashion. Fluoride has been added to the drinking water in an effort to imitate the natural situation. Tooth surfaces have been treated with every conceivable form of fluoride. This empirical approach has worked very well but even more progress might have been made if fuller attention had been given to the mechanism of fluoride action as understood from the findings of basic research.

Mechanism of Action

Fluoride probably acts by making enamel mineral more stable. Most of the mineral consists of tiny crystals of calcium phosphate with the well known lattice structure of hydroxyapatite[4]. The lattice contains columns of hydroxyl ions, each situated adjacent to calcium ions, to which they are electrostatically attracted **(Fig. 1)**. Some hydroxyl ions are invariably missing and the others can therefore shuffle about in the column. The hydroxyl column is therefore a relatively mobile and highly reactive feature of the lattice.

When a hydroxyl ion is replaced by a fluoride ion, however, the situation changes. Hydroge bonds form between the highly electro-negative fluoride ion and the oxygen atom of the adjacent hydroxyl group **(Fig. 2)**. The fluoride ion fits more exactly between the calcium ions than did the hydroxyl ion and there is therefore now more electrostatic attraction between the fluorides and the calciums. The mobility of the hydroxyl column and the reactivity of the lattice as a whole is consequently

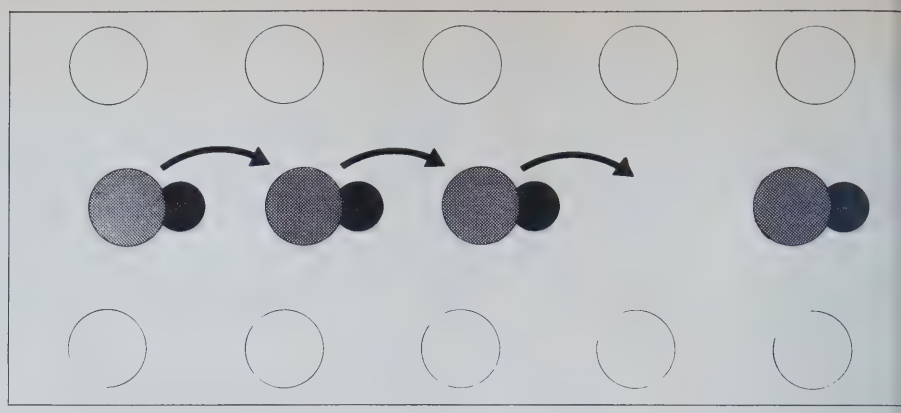


Fig. 1. *Side-on view of apatite crystal lattice, showing the relationship between the hydroxyl ions and nearby calcium ions. Grey circle = oxygen. Black circle = hydrogen. Open circle = calcium.*

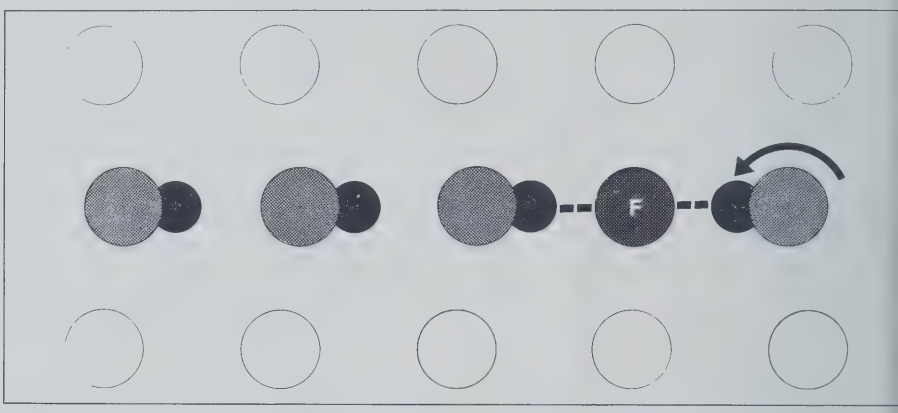


Fig. 2. *The presence of fluoride lends stability to the hydroxyl column and apatite lattice (see text). Grey circle = oxygen. Black circle = hydrogen. Open circle = calcium. Dark grey circle (F) = fluoride.*

reduced. This 'fluoridated' mineral is more stable. It dissolves less easily than before and it forms more easily if conditions allow it to do so.

This is the theoretical basis for the classical explanation of fluoride action and it can be fitted nicely with certain facts about the nature and chemistry of the tooth. For instance, fluoride is not distributed evenly throughout dental enamel. Outer enamel has a higher fluoride concentration than interior enamel **(Fig. 3)**. For a number of years, the consensus of opinion was that resistance to caries was due to this protective outer coat of highly fluoridated mineral. The conclusion was drawn that the more fluoride there was in the enamel the more resistant it would be to carious attack. Since earlier, contradictory, findings, many attempts have been made to prove this[5,6,7,8] and, merely assuming it to be true, even more numerous attempts have been made to increase deliberately the fluoride content of the enamel. Both approaches have only been moderately successful. It is true in a general sense that individuals who live in regions with fluoridated drinking water have a lower caries incidence and more fluoride in their enamel[9,10,11]. This only refers to *average* fluoride concentrations, however. There are enormous variations from place to place on the surface of individual teeth[12] **(Fig. 4)** and this, coupled with the fact that concentrations of fluoride in the tooth surface rise when a lesion begins to form[12,13,14] makes it difficult to compare one tooth with another in a meaningful way. In attempting to increase the fluoride content of the enamel, it was applied to the teeth in fluoridated dentifrices, mouth rinses and various other vehicles. Such treatment did not always notably increase the fluoride content of the sound enamel[7] although it did usually reduce caries incidence[15]. Fluoride is not readily incorporated into mature, sound enamel. That which is lost by wear is not normally replaced[16,17,18] **(Fig. 5)** and that which is taken up from concentrated solutions etc. probably diffuses out again[19]. The layer of high fluoride enamel at the tooth surface is clearly only part of the story and perhaps not a very important part.

The present consensus seems to be that fluoride acts primarily at the site of lesion formation. At the time when the pH at the tooth surface is low and a lesion is about to form, the movement of ions from enamel

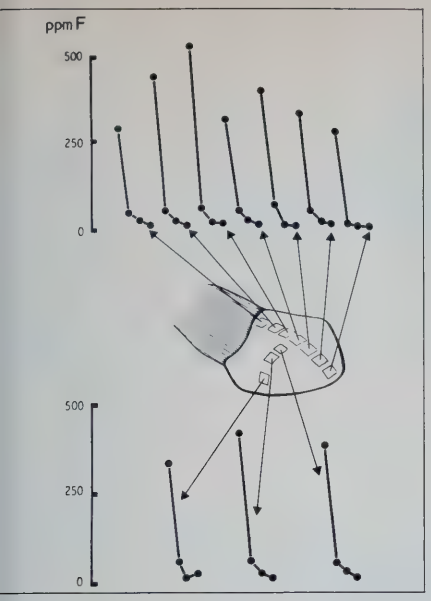


Fig. 3. Fluoride distribution curves in ten regions of the enamel surface of a tooth from a 15-year old child resident in Leeds. Each curve represents the fluoride concentration in four successive layers of enamel each about 20 μm thick taken from the surface to the interior of the tooth's enamel[17].

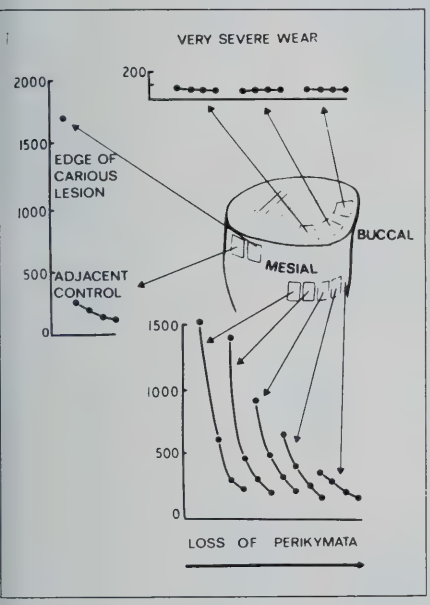
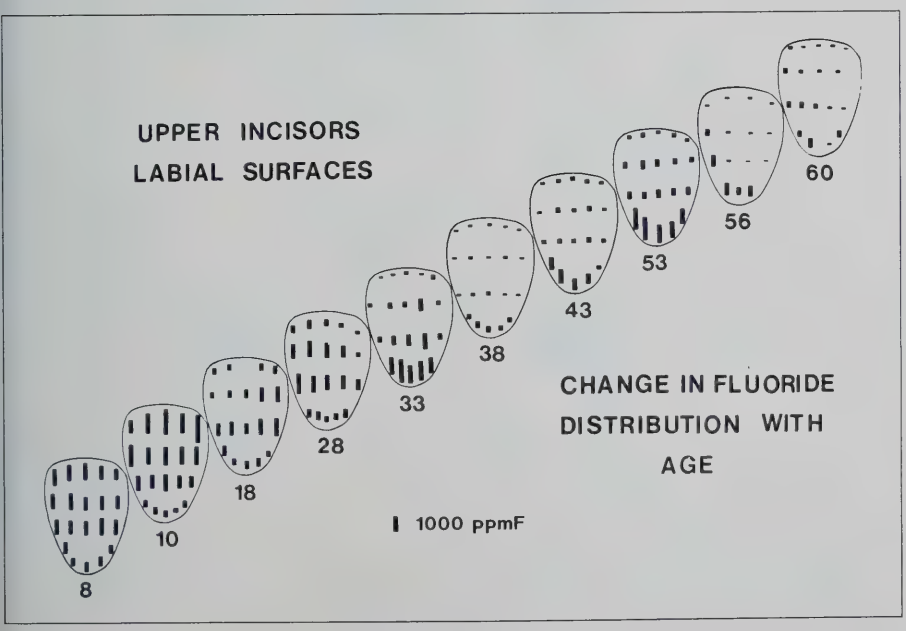


Fig. 4 Gradients of fluoride concentration from surface to interior in the enamel surface of a severely worn premolar tooth, each point on the curves representing the fluoride concentration in a layer of enamel about 20 μm thick.

Fig. 5. Diagrammatic representation of fluoride distribution in the labial surfaces of 10 upper incisors extracted from patients attending the School of Dentistry at Leeds (fluoride concentration of the drinking water <0.1ppm). The fluoride concentration at the various sites in a layer of surface enamel about 20 μm thick, occupying an area of about 1mm² are represented by solid bars (see scale). The patient's age is shown below the cervical margin of each tooth.[18]



into the plaque and from plaque into enamel, will greatly increase. The direction of this dynamic equilibrium will be influenced by the presence of ions such as fluoride, for it not only makes apatite more stable, it also encourages apatite to form. The presence of fluoride in the fluid phase, either within the enamel or in the plaque fluid, can push the surface reaction towards mineral formation and away from mineral destruction. The lesion which was about to form will cease to progress and perhaps the porosity which had already developed in the enamel will be occluded by remineralization[20,21,22,23,24,25,26].

Timing of Fluoride Administration

If fluoride acts in this way, the timing of its administration will be crucial. It should be available at the site of attack on the enamel at the moment a carious lesion begins to form. The first stage of lesion formation, the development of the so-called translucent zone, does not chiefly involve the dissolution of hydroxyapatite but the removal of an acid-labile magnesium and carbonate-rich fraction of the enamel mineral, amounting to about 1 per cent by volume. Careful examination of extracted teeth reveals, almost always, some sign of change near the contact points of approximal enamel, even in recently erupted teeth extracted for orthodontic reasons. From this it would appear that the initial stages of carious attack probably occur whenever bacterial plaque accumulates on an enamel surface. Fluoride should be most effective at this early stage and must therefore be available to the enamel at this time.

In pits and fissures, plaque will accumulate (and this first stage of lesion formation will therefore occur) as soon as the tooth emerges into the oral cavity. To a more variable extent, depending upon oral hygiene, diet and the rate of tooth eruption, this will also happen at gingival margins. On smooth mesial and distal surfaces, however, plaque will only accumulate when two adjacent teeth approach close enough to form a trap where plaque can collect. If there *is* no such adjacent tooth, as with the distal surface of the first permanent molars, less plaque will collect and little caries will be expected until the second molars erupt some six years later[27,28,29]. It is also interesting to see how in general, the pattern of carious attack in 13 year old children[29] reflects the length of time each mesial or distal surface has had an adjacent deciduous or permanent tooth next to it, this having been estimated or 'guesstimated', from data on tooth eruption published 50 years earlier[30] (**Fig. 6**). At 13 years of age, the initial stage of lesion formation having occurred in most of the teeth, the development of a clinical lesion will presumably depend upon the state of the tooth and the oral environment. This will include the effects of diet, oral hygiene, measures taken to control this environment, steps taken to increase the resistance of the enamel or to remineralise any lesions and biological factors such as salivary flow and salivary composition. The most obvious

discrepancy between the two sets of data presented in **Fig. 6** is the relatively low caries-prevalence of the lower anterior teeth and this is, in fact, presumably attributable to the exceptionally rapid flow of saliva in this region of the mouth.

It would therefore seem that the crucial time for caries prevention is up to the age of 13 or so. After this, most teeth have already erupted and in many surfaces caries is already well advanced. A layman, aware of this picture, would surely be very surprised to hear that many clinical trials are carried out on children aged 12-15 years. While logistically convenient, such trials might be somewhat analogous to carrying out chemical reactions with denatured chemical reagents. It would certainly not be surprising to find that the application of toothpaste throughout the period of eruption would be considerably more effective than would be indicated by a clinical trial carried out on 12-15 year old children. In the U.K., the proportion of toothpaste which contains fluoride has increased dramatically over the last ten years and it is very tempting to link this with the fall in caries which has occurred during the same period (**Fig. 7**). Unfortunately, clinical trials have sometimes indicated that such dentifrice has a very variable effect and so could scarcely contribute much to the decrease in caries which has occurred in the population. Perhaps, however, if more attention had been paid to the background knowledge of tooth development and the way in which fluoride might act, clinical trials might have been designed or at least interpreted more appropriately and could have given a more realistic, and more favourable, view of the efficacy of fluoridated toothpaste.

Means of Fluoride Administration

We need to know how best to supply fluoride. The treatment is to cover the entire period of tooth eruption and beyond so fluoride must be regularly administered over many years, probably throughout life; for secondary caries must also be prevented. In this respect, the advantages of water fluoridation are very clear; the fluoride will be taken up continually, without effort and at a small, regular and easily controlled optimum dosage. An alternative way, though technically more difficult, would be to devise a means of slowly releasing fluoride from a device in the mouth and several workers have experimented with this[31,32,33]. Other workers have attempted to increase the duration of exposure to fluoride by instructing their patients to allow fluoride tablets to dissolve as slowly as possible in the mouth[34]. One of the problems

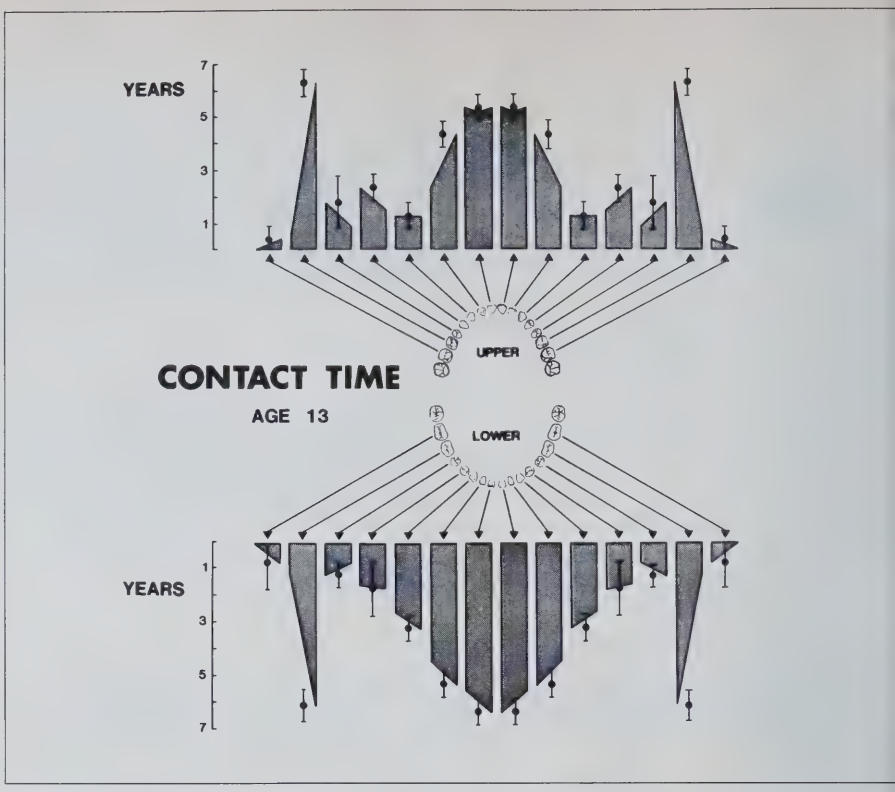


Fig. 6a *Based on data of eruption time[30], an attempt has been made to estimate the time during which each mesial or distal surface has been associated with a neighbouring tooth by the age of 13 years. Each dot represents the eruption time of the tooth with the vertical line through the dot showing the range of eruption time and the lengths of the vertical sides of each column corresponding to the estimated time of contact between that surface and the adjacent deciduous or permanent tooth[30].*

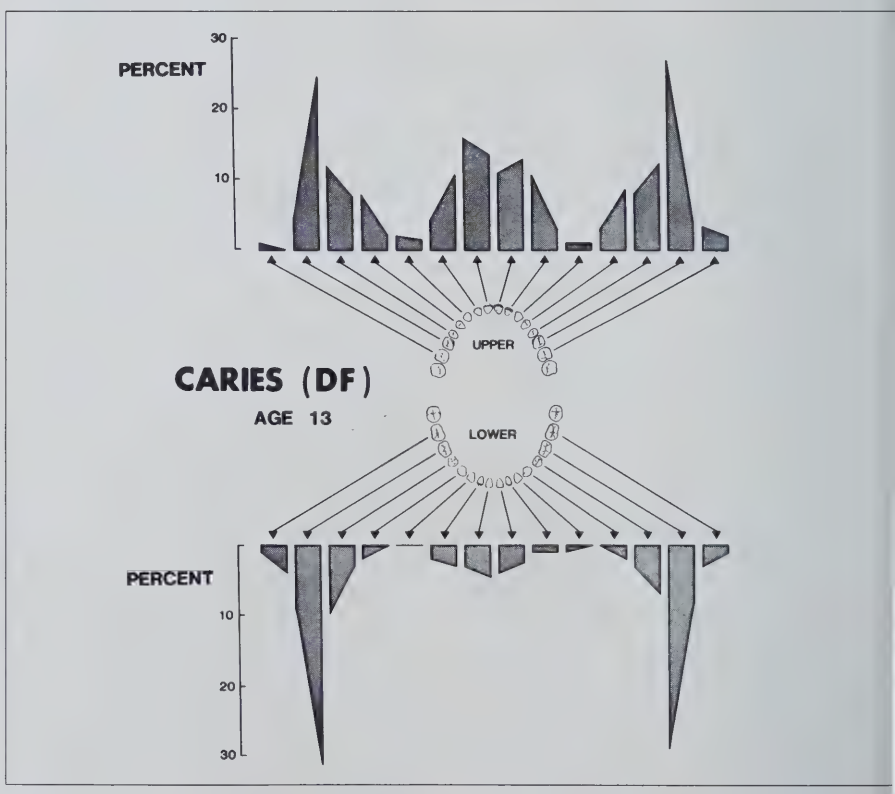


Fig. 6b *Percentage distribution of caries in approximal surfaces (total; secondary and primary decayed and filled surfaces) at the age of 13 years[29].*

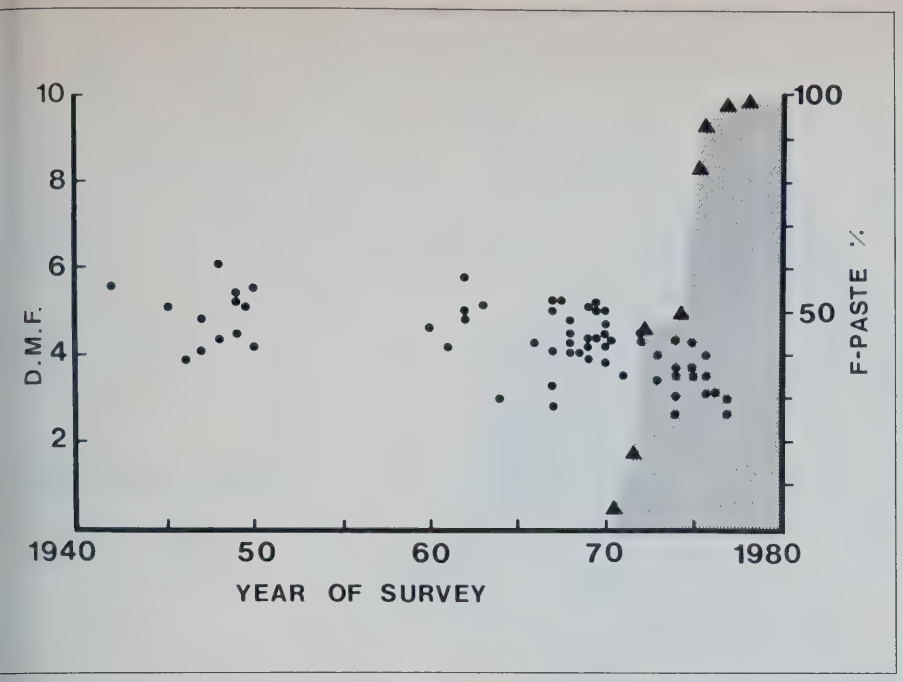


Fig. 7 Scatter diagram of decayed, missing and filled deciduous teeth (d.m.f.) of 5-year-old children in the U.K. Data taken from surveys carried out between 1940 and 1978. The shaded area shows the increasing percentage of toothpaste marketed in the U.K. which contains fluoride[45].

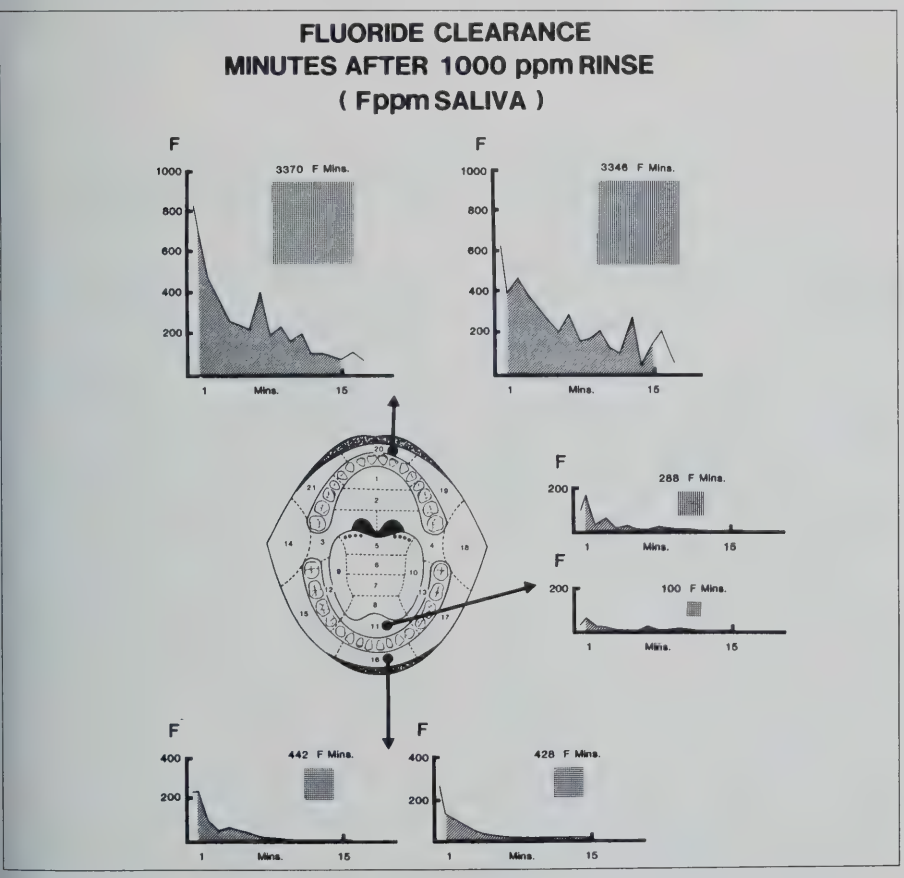


Fig. 9 Fluoride retention in saliva from the upper and lower labial vestibules and in the sub-lingual region of the mouth of an individual after rinsing with a neutral solution containing 1000ppm fluoride. For ease of comparison, the area under the curve has been represented in the form of a square (fluoride minutes), duplicate measurements having been made on different days. The diagram of the mouth was a modified version of that published by Moore and Catlin[47].

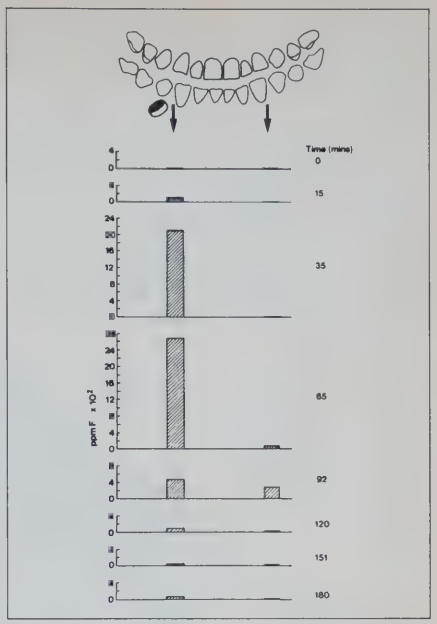


Fig. 8 Fluoride concentrations in samples of saliva removed from the sites indicated by the arrows at various time intervals after placing a fluoride tablet (1mgF as NaF) in the lower right vestibule[46].

in this area, however, is that saliva does not mix readily. Releasing fluoride at one site does not guarantee that it will migrate to another (**Fig. 8**). The fluoride concentration in the neighbourhood of the tablet rises and falls again but this increased concentration on one side of the mouth can have relatively little influence on fluoride concentrations at the other side. Most of the fluoride is quickly lost by swallowing. Although the remainder might have a significant effect on caries incidence, it does seem rather a wasteful procedure. Faced with this picture, one might encourage children to move the tablet around the mouth or instruct the tablet to dissolve at the left hand side of the mouth on one day and on the right hand side of the mouth on the next. Alternatively, one might suggest regularly rinsing the mouth with a fluoride solution or propose the use of a fluoridated dentifrice; the additional use of the toothbrush has obvious advantages. Both rinsing and brushing will certainly introduce fluoride to all regions of the mouth. The question in this case is how long will the fluoride stay there? According to some recent experiments we carried out in Leeds, most of the fluoride from rinsing or brushing, seems to disappear very quickly indeed, although there were considerable variations from one region to another. Beneath the tongue, fluoride stayed only for a couple of minutes. In the lower labial vestibule it was retained for a little longer and in the anterior part of the upper vestibule it stayed for about ten times as long

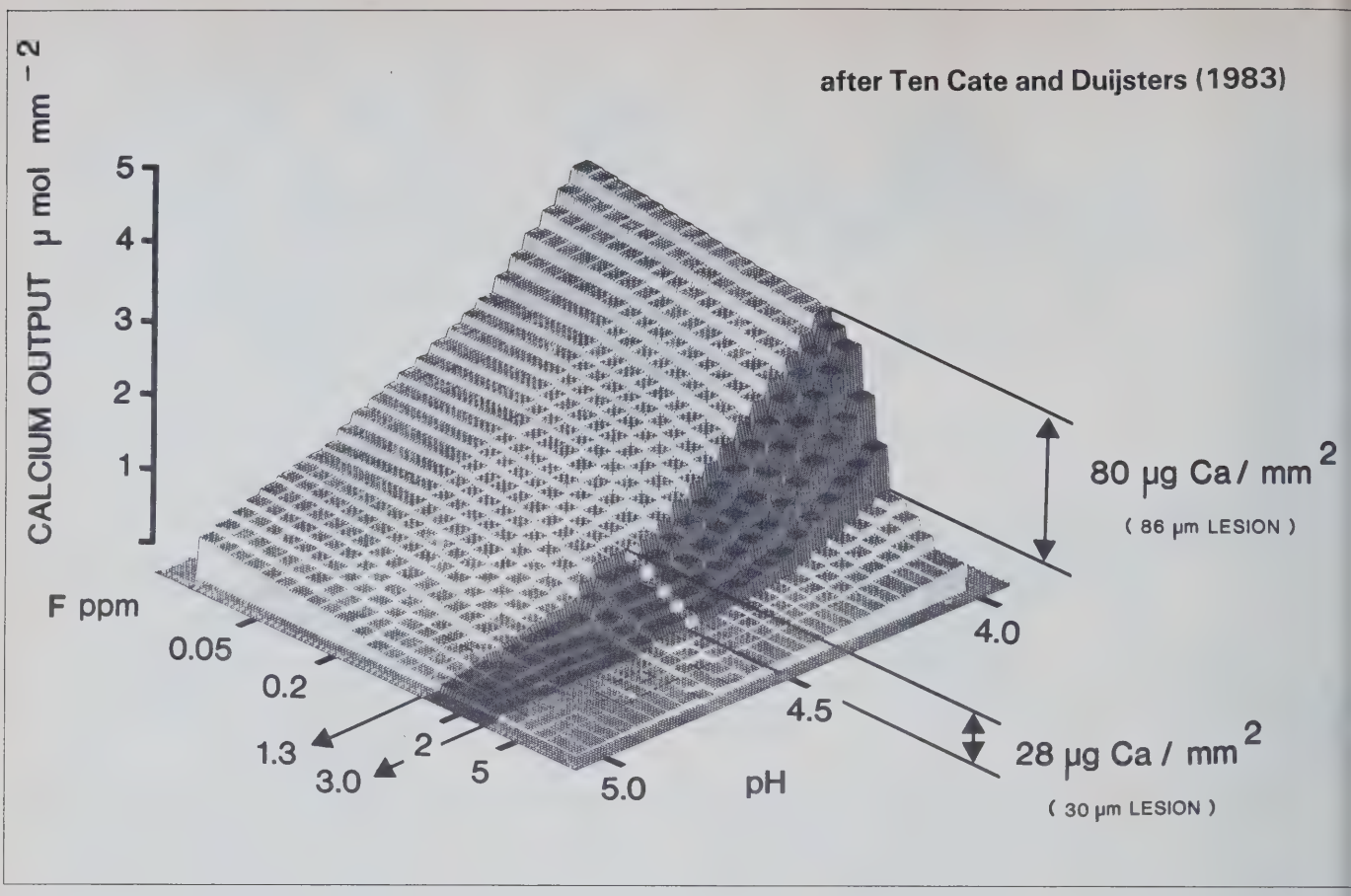


Fig. 10. Calcium output from enamel, in vitro, *in relation to the initial fluoride concentration and the pH of the demineralizing solution (after Ten Cate and Duijsters)* [26]. *The darker hatched area, delineating a steep decrease in the amount of calcium lost from the enamel, occurs within a range of fluoride concentration from about 1-3ppm. This reduction in calcium output (per mm²) would correspond to the prevention of a lesion about 86 μm deep (at pH4) or 30 μm deep (at pH 4.5).*

(Fig. 9). The areas under such fluoride retention curves could be used to compare fluoride retention in one area of the mouth with that in another, using the term 'fluoride minutes' rather than 'fluoride concentration'. The assumption behind this approach, however, would be that a little fluoride present for a long time was as effective as a higher concentration present for a short time. Research would be needed to find out the extent to which such an assumption were true. On the other hand, we might be dealing with levels of fluoride in the saliva which, although significant from the caries point of view, were an order or two lower than those discussed above.

It seems very probable that this is the case. We need to know how much fluoride is required at the site of attack to prevent a lesion forming, or arrest its progress and to encourage remineralisation of any lesion which has already developed. This is the point at which our current information begins to peter out. It is the area where research is needed at the moment. Some of the earlier *in vitro* data suggested that concentrations of fluoride less than about 20ppm would have no effect on the remineralisation of an incipient lesion[35]. More recent *in vivo* work, on the other hand, has shown that a salivary concentration of about 0.5ppm can accelerate the remineralisation of acid-softened enamel[36]. Concentrations lower than this, had no observable effect. This concentration seems to be homing in on the region highlighted by the *in vitro* work of ten Cate and Duijsters, referred to above[26], who have shown that concentrations of, say, 0.5ppm and above, can stop significant amounts of calcium and phosphate leaving the enamel at the sort of pH associated with carious attack (Fig. 10).

The present conclusion would therefore be that we want a fluoride concentration of not less than 0.5ppm in and around the lesion at the time of a carious attack. This may not be the final word to be said on the matter but it is perhaps the sort of level we should aim at clinically until we have more information.

The concentration of fluoride in and around the lesion, however, will not entirely depend upon the current level of fluoride in the saliva or even the concentration of fluoride present in the plaque. As mentioned previously[12,13,14], fluoride is readily taken up by enamel as soon as a carious lesion begins to form. Repeated doses of fluoride will lead to a gradual accumulation of fluoride within such porous regions of enamel. The success of fluoride treatment could well be due primarily to the acquisition of a sufficiently high reservoir of fluoride in the forming lesion and perhaps in the plaque, which can also accumulate fluoride[37,38,39]. When the pH drops during carious attack, some of this fluoride could be released and assist in the process of remineralization, pushing the dynamic equilibrium in the direction of mineral formation and away from the direction of mineral destruction.

Difficulties with Fluoride Administration

It is easy to see why the fluoridation of public water supplies offers the most effective procedure for the administration of fluoride. It is safe, it is cheap and it avoids the complications associated with most other techniques of fluoride administration. It is a very attractive means of caries

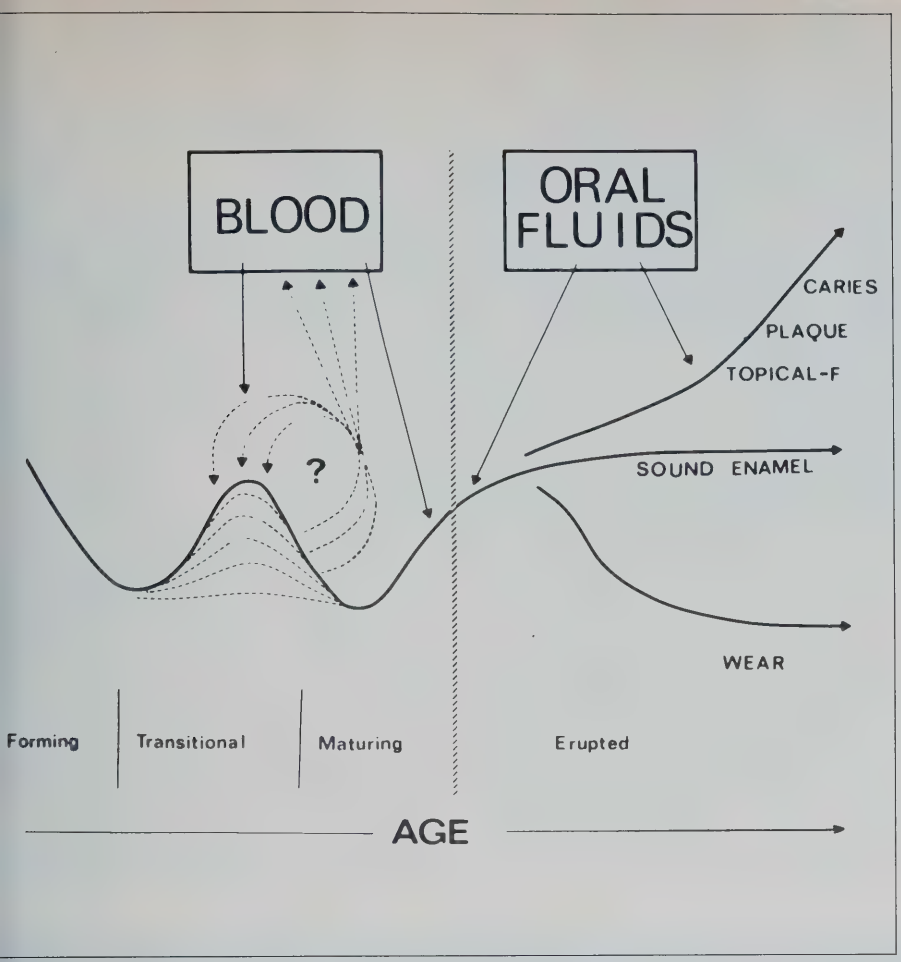


Fig. 11. An attempt to summarise current information about the concentration of fluoride in enamel throughout the life of the tooth[12].

prevention. Unfortunately, there are large populations without central water supplies. There are also, almost invariably, highly organized groups who implacably object to this public health measure. Consequently, almost every means imaginable has been used as a vehicle for fluoride administration. It has been supplied in salt, soft drinks, sugar, milk, gum, tablets, gels, rinses, toothpastes: even as fluoridated toothpicks! Sometimes the approach to fluoride administration seems to ignore the fact that this most electro-negative of all elements and one of the most reactive has a very high biological activity. It is true that the more serious effects of fluoride are well known. So far as the teeth are concerned the chief danger seems restricted to the period of enamel development. Work carried out by ourselves and others[40,41,42] suggests that enamel is so sensitive to fluoride poisoning, simply because of its unique pattern of development. Early maturing enamel seems to accumulate fluoride in a fairly labile form which could affect overlying ameloblasts. Until the mechanism of dental fluorosis is *thoroughly* established, however, we do not know what we are doing and are certainly in no real position to debate, for example, the appropriateness of *in utero* fluoride administration.

So far as the anti-caries effect is concerned, much of the fluoride accumulated at this developmental stage seems to be lost again as the enamel mineralizes and so contributes relatively little to the high concentration of fluoride present in the erupted enamel surface. **(Fig. 11)** This is probably acquired at a later stage of tooth development, when the shape and size of enamel is complete but before its outer surface is fully mineralized. This probably amounts to the years immediately before and immediately after the tooth has erupted. From a clinical point of view, it is probably therefore just as effective to fluoridate the enamel by topically applying fluoride to the tooth after eruption as by attempting to do the same by administering fluoride before tooth eruption. Since it is also impossible to treat one unerupted tooth without supplying fluoride to others at an earlier and perhaps more sensitive stage of development, there is an inherent danger of fluorosis. No amount of fluoride applied to an erupted tooth surface can produce fluorosis unless the patient is allowed to swallow too much of it, an event against which sufficient precautions have apparently not always been taken[43]. There are those who would argue, perhaps with justification, against this attitude which is somewhat restricting, clinically. Whatever policy we pursue, however, must be firmly and rationally based upon scientifically established concepts of fluoride action and these can only be derived from appropriate research.

CONCLUSIONS

I hope this consideration of fluoride has illustrated how work in the laboratory could help to achieve clinical aims. I hope it has also demonstrated the possible effect of failing to take note of background information when attempting to solve or interpret clinical problems. It is clearly important to adopt a rational approach based on solid background information. Unless we do, we will wander in an empirical fog.

The discussion was not solely intended to air the problems and virtues of fluoride therapy. Other ions, like strontium, doubtless have significance in the fight against dental caries. Alternatively, the disease might be effectively controlled using remineralising solutions. There is more than one approach but until the basic mechanism of any approach is understood it is unlikely that its full potential will be achieved. What is even more important, unless the basic mechanism is understood, we will not know when the maximum potential of an approach *has* been achieved.

Returning to fluoride, I do not think that this point has yet been reached.

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THE SIGNIFICANCE OF REMINERALIZATION IN CARIES PREVENTION

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ABSTRACT

Remineralization occurs naturally during the formation of a carious lesion in human enamel and is responsible for the appearance of two of the four histological zones. Exposure of small lesions to a synthetic calcifying fluid **in vitro** *results in a significant increase in remineralization. The degree of remineralization achieved depends upon the presence of fluoride ions in the calcifying fluid and it appears that only low levels are necessary to initiate the mechanism. Raising the fluoride level further does not result in a greater degree of remineralization. The calcium ion concentration of the calcifying fluid appears to be critical with respect to which components of the fluid are supersaturated and this determines the degree of remineralization achieved. The use of a new micro-dissection/high resolution SEM technique has made it possible to examine single crystals within the four zones of the enamel lesion. In both the dark zone and the surface zone, crystal diameters are significantly larger than those in sound enamel, giving direct evidence of crystal growth as a result of remineralization. After experimental remineralization of a lesion* **in vitro**, *there was an increase in crystal diameters throughout the entire lesion.*

RÉSUMÉ

La reminéralisation de l'émail humain se produit d'une manière naturelle quand des lésions carieuses se forment, et est responsable de l'apparition de deux des quatre zones histologiques. L'exposition de petites lésions à un liquide calcifiant synthétique occasionne, en éprouvette, une augmentation importante de la reminéralisation. Le degré de reminéralisation obtenu dépend de la présence d'ions de fluorure dans le liquide calcifiant, et il semble que des niveaux peu élevés suffisent à amorcer le processus. Un accroissement du niveau de fluorure n'occasionne pas une augmentation du degré de minéralisation. La concentration d'ions de calcium dans le liquide calcifiant semble être critique pour déterminer les éléments de liquide sursaturés et obtenir un certain degré de reminéralisation. L'utilisation d'une nouvelle technique de microdissection au microscope électronique à balayage à haute résolution rend possible l'examen de simples cristaux à l'intérieur des quatre zones de lésion de l'émail. Dans la zone sombre aussi bien que dans la zone de surface, le diamètre des cristaux est beaucoup plus important que celui des cristaux qui se trouvent dans l'émail sain, ce qui prouve que l'existence de cristaux dont la taille a augmenté à la suite de reminéralisation. Après reminéralisation expérimentale d'une lésion en éprouvette, il y a augmentation du diamètre des cristaux dans toute la lésion.

INTRODUCTION

A great deal of clinical and scientific information exists to support the claim that small carious lesions can regress, a process referred to as remineralization. Backer-Dirks (1966) and others have recorded reversals in clinical diagnosis whereby lesions detected clinically and by bitewing radiography apparently disappeared when examined at a later date using identical criteria. Experimental studies by Koulourides and co-workers (1968) have shown that acid-softened enamel surfaces can reharden *in vitro* after the application of a calcifying fluid. Studies by Silverstone (1973, 1977) have shown that exposure of small artificial caries-like lesions to a calcifying fluid *in vitro* produced a significant degree of remineralization. After experiment, lesions showed histological features which indicated that they were at a much earlier stage in development than prior to exposure to the calcifying fluid.

The small lesion of enamel caries is posi-

tioned deep to a well-mineralized surface layer and has been shown to consist of four well-recognized histological zones when examined with the polarizing microscope (Silverstone, 1973). Silverstone (1977) has presented evidence to show that two of the zones, the dark zone (Zone 2) and the surface zone (Zone 4), are formed as a result of remineralization phenomena. Thus, the creation of a lesion in human dental enamel is the result of a dynamic series of events and not a process of simple continuing demineralization. The remaining two zones of the carious lesion, the translucent zone (Zone 1) and the body of the lesion (Zone 3), are produced as a result of demineralization. The two zones created by remineralization phenomena cannot be simulated *in vitro* when samples of human enamel are exposed to dilute acid solutions alone. To date, the only technique which is able to create lesions in human enamel which appear histologically indistinguishable from enamel caries is the one employing acidified gels. Lesions showing both dark zones and surface zones are created using this technique. In addition, such lesions have irregular advancing fronts comparable to those found in naturally occurring lesions, as opposed to advancing fronts maintaining a direction parallel with the enamel surface as found with acid lesions.

The surface zone of enamel caries has been defined by Silverstone (1968) as the zone at the surface of the lesion which shows a negative birefringence when the ground section is examined in water with the polarizing microscope. It is not adequate enough to show a surface layer which appears radiopaque relative to the subsurface region on a microradiograph. This radiopaque zone may coincide with the presence of a true surface zone. However, when the surface zone is finally demineralized later on in lesion progression, and not identified histologically as "the surface zone", the microradiographic appearance of the enamel surface remains unchanged.

The dark zone is defined as the zone at the advancing front of the lesion positioned deep to the body of the lesion and placed superficial to the translucent zone. This zone exhibits positive birefringence when the section is examined in quinoline (n=1.62) with the polarizing microscope. It has been shown that the reversal of observed birefringence in the dark zone from negative to positive when examined in quinoline is due to a molecular sieve pore arrangement in the tissue (Poole et al., 1961; Darling et al., 1961). The exclusion of large molecules from the micropores, which remain "filled" with air or vapour, results in the production of excessive amounts of positive form birefringence which can either reduce, compensate or

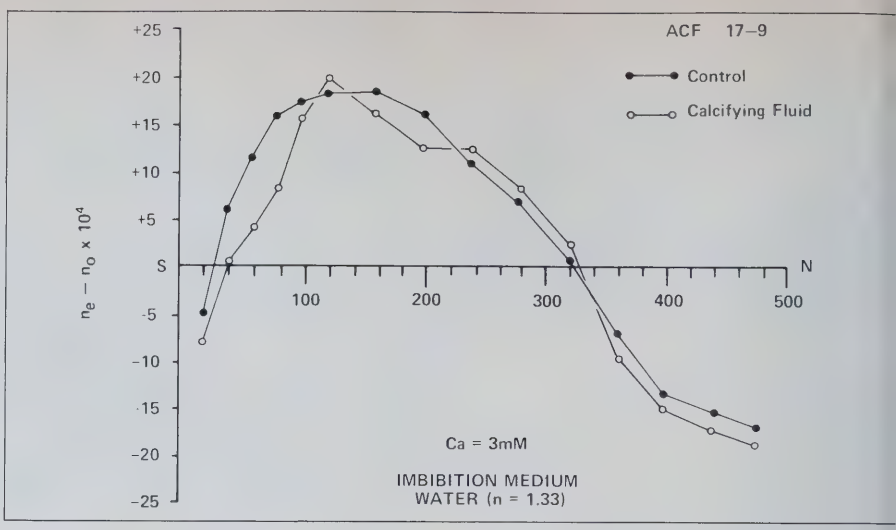

Fig. 1. *An imbibition graph showing the effect on an enamel lesion of exposure to the 3mM calcium calcifying fluid containing 0.05mM fluoride ions. The abscissa S-N represents a traverse from the enamel surface (S) through the lesion and into normal enamel (N). Both test (o—— o) and control (•——•) lesions show similar depth from the enamel surface. The test lesion shows a reduction in observed birefringence (ordinate) relative to the control indicating a reduction in porosity. This reduction is limited to the superficial aspects of the lesion.*

reverse the negative birefringence of the sound enamel. Therefore, the change from reduced negative birefringence to positive birefringence at the advancing front of the lesion can be brought about by only a very small increase in the volume of micropores.

Silverstone (1967, 1972, 1973) and Silverstone and Poole (1968, 1969) showed that when a lesion was exposed to either oral fluid or a synthetic calcifying fluid *in vitro*, the lesion decreased in size dramatically. In addition to showing histological features indicative of an earlier stage in lesion formation, the dark zone became broader, spreading superficially back towards the enamel surface. Thus, part of the region identified on the control as the body of the lesion (Zone 3), showed the histological properties of the preceding stage of breakdown, the dark zone (Zone 2). Not only was there a significant reduction in porosity, but also the region showed a molecular sieve behavior due to the presence of a series of micropores.

This demonstrated that the appearance of the micropores was not due to the breakdown of specific areas of the tissue, as was thought originally, but to remineralization whereby the original large pores were "filled-in", completely in some areas and partially in others.

There is much evidence to support the contention that acid-softened enamel surfaces can be rehardened *in vitro* and a major contribution has been made in this field by Koulourides and co-workers (1968). Although such rehardening experiments are believed to be comparable to remineralization, modification of an outer softened layer of enamel at the surface differs from the situation found in the intact surface of a carious lesion. In the carious lesion, the outer layer of enamel, to a depth of approximately 30 μm, appears not only intact, but also relatively unaffected by the attack compared to the immediate subsurface region. This layer is the surface zone of the enamel lesion and it is through this well mineralized barrier that remineralization of the enamel lesion occurs. Previous experiments on the remineralization *in vitro* of both natural and artificial lesions have shown that both types of lesions can be reduced in size and porosity (Silverstone, 1977). This occurred by the deposition of mineral into the damaged enamel after exposure to a calcifying fluid. Recent work has concentrated on the remineralizing effect of using different concentrations of various ions in a synthetic calcifying fluid on enamel lesions *in vitro*. Artificial lesions have been used in preference to natural ones since the lesions can be created having predetermined characteristics. In addition, by creating an artificial lesion over a relatively wide test area, there is sufficient lesion surface to not only have adequate controls, but also to test different remineralization regimens on the single lesion. Examination of control sections from a lesion using a range of imbibition media in conjunction with the polarizing microscope makes it possible to study indirectly the ultrastructure of the tissue. Thus, variations in pore volume in test and control regions can be assessed accurately as well as the total amount of oriented mineral in a particular region of a lesion.

The present studies were carried out to investigate two aspects of the remineralization process. Firstly, to quantitate the

effect fluoride ions have on the remineralization of enamel lesions *in vitro*. Secondly, to investigate what effect remineralization has on the submicroscopic crystalline structure of the lesion.

EFFECT OF FLUORIDE ON REMINERALIZATION

The majority of experimental work on the remineralization of acid damaged enamel has been assessed by changes in the microhardness of surface enamel. In such studies, the original enamel surface is ground and polished flat so that surface hardness measurements can be carried out. Such studies concentrate on the softening and subsequent rehardening of the outer 5 μm of the enamel surface. Since the small carious lesion in human enamel is positioned deep to an intact and well-mineralized surfaced layer which is approximately 30 μm in depth, it may be difficult to extrapolate results of surface microhardness studies to the mechanisms involved in initiation and repair of the small enamel lesion.

Previous histological studies on the small enamel lesion and its remineralization *in vitro* have been well-documented (Silverstone, 1977; ten Cate and Arends, 1977). One factor common to many of the results obtained on the remineralization of either enamel caries, artificial caries, or acid-etched enamel is that the presence of fluoride ions enhances greatly the degree of remineralization achieved, and reduces the time period for this mechanism to occur. The aim of this part of the present investigation was to quantitate the effect that fluoride has on the degree of remineralization of enamel lesions *in vitro*.

The synthetic calcifying fluid used in these studies was prepared from synthetic hydroxyapatite having a calcium/phosphate ratio of 1.63. Solutions having two different calcium concentrations were used. These were 1 mM and 3 mM, the phosphate concentrations remaining at the fixed ratio of 1.63. Sodium chloride at a final concentration of 200 mM was added to the fluids which were adjusted to pH 7.0 using 0.05 M potassium hydroxide. Fluoride was added to some of the calcifying fluids at concentrations of either 0.05 mM or 0.50 mM.

Exposure times of specimens to either of the synthetic calcifying fluids were either five or 10 consecutive six-minute exposure increments, as well as a single one-hour exposure. At the completion of a series of exposures, specimens were washed in agitated deionized distilled water for 24 hours.

Artificial caries-like lesions were used in the experiments to provide a source of highly reproducible lesions having histological characteristics identical to those of enamel caries. Forty caries-free human premolar teeth were used in these studies. The teeth were extracted for orthodontic purposes and were painted with varnish leaving enamel windows exposed on buccal and lingual surfaces. Teeth were then exposed to acidified gelatin gels for the creation of a caries-like lesions as described previously (Silverstone, 1973, 1977). Small naturally occurring lesions of enamel caries were also used in the studies.

TABLE 1.

Media used in the imbibition studies.

Media	Refractive Index	Molecular Volume (cm^3/mole)
Air	1.0	
Aqueous		
Water	1.33	18
Thoulet's medium	1.41	dilutions of
Thoulet's medium	1.47	saturated
Thoulet's medium	1.54	potassium
Thoulet's medium	1.62	mercuric iodide
Alcohols & Quinoline		
Methanol	1.33	40.5
Ethanol	1.36	59
n-Propanol	1.38	75
n-Butanol	1.40	92
n-Pentanol	1.41	108
n-Hexanol	1.42	125
n-Heptanol	1.42	141
n-Octanol	1.43	157
Quinoline	1.62	118

After removing teeth from the artificial caries medium, a single central longitudinal section was slit from the tooth to act as a control. Histological features of lesions from control sections were documented both qualitatively and quantitatively using the polarizing microscope. Microradiographs were also taken of the sections using CuKα radiation and employing a step-wedge. The cut faces on the remaining tooth halves were then varnished over so that just the surface above each lesion was exposed for experiment. Tooth halves were then exposed to the synthetic calcifying fluid; one tooth half was exposed to the experimental fluid while the adjacent half of the same tooth was exposed to the identical fluid but containing added fluoride ions. After exposure, tooth halves were washed, the surfaces brushed using water and an automatic toothbrush, and ground sections obtained from each half.

Thin undemineralized and unembedded sections were prepared using The Silverstone-Taylor Hard Tissue Microtome (Silverstone and Taylor, 1982). Ground sections were examined with the polarizing microscope using a series of aqueous and alcoholic imbibition media (**Table 1**). Quantitative imbibition studies were carried out on selected lesions from each treatment category using an Ehringhaus compensator in conjunction with the polarizing microscope. In addition, contour maps of lesions were constructed by plotting the pseudo-istropic border zones seen after imbibition with Thoulet's media having refactive indices of 1.41 and 1.47, together with water (n=1.33) and air (n=1.0). The area of distribution of contours was assessed using an Imanco Quantimet Image Analyzer 720. In this manner it was possible to compare experimental halves of lesions with each other and with their respective controls.

Both test and control tooth surfaces were also examined by scanning electron microscopy, using a Jeol JSM 35C SEM, after vacuum coating specimens with gold-palladium.

DISCUSSION

When the synthetic calcifying fluid was employed, remineralization occurred although differences were found between the fluids having different calcium levels. In addition, the presence or absence of fluoride ions had a significant effect on the results.

TABLE 2.

Mean reductions in area of the body of the lesion from ground sections of groups of groups of 10 randomly selected artificial lesions after exposure to either the 3 mM or 1 mM calcium calcifying fluid with and without the addition of fluoride ions.

Calcifying Fluid	% Reduction of Body of Lesion
3mM Ca	9
3mM Ca + F	24
1mM Ca	22
1mM Ca + F	72

Figure 1 shows an imbibition graph from these experiments demonstrating the effect on a lesion of exposure to the 3 mM calcium calcifying fluid containing 0.05 mM fluoride ions. Both test (o——o) and control (•——•) lesions show similar depths although there is a reduction in size of the test lesion relative to the control. The main change is related to the superficial aspect of the body of the lesion. The test lesion shows a reduction in observed positive birefringence, and therefore in poros-

Fig. 2 Scanning electron micrograph showing the enamel surface superficial to a lesion exposed to the 3mM calcium calcifying fluid containing fluoride ions. Numerous crystals can be seen which are continuous with the surface structure.

5 μm

Fig. 3. Scanning electron micrograph of another enamel surface exposed to the 3mM calcifying fluid containing fluoride for a one hour exposure period. Numerous crystals can be seen growing from the enamel surface and which vary from plates to rosettes.

5 μm

ity, to a depth of approximately 100 μm relative to the control. Deep to this, only small changes can be seen relative to the control. When the 3 mM calcium calcifying fluid was used without the addition of fluoride ions a mean reduction in area of the body of the lesion for 10 lesions was found to be 9 per cent. With the addition of fluoride ions, a further reduction in porosity was obtained, the mean reduction being 24 per cent **(Table 2)**.

Ultrastructural examination of surfaces treated with the 3 mM calcium calcifying fluid containing fluoride showed the presence of numerous crystals **(Figure 2)**. Clusters of crystalline material were seen growing from the enamel structure and these varied from small rosettes to large plate-like structures **(Figure 3)**.

When the calcifying fluid containing only 1 mM calcium was used remineralization occurred through the entire depth of the lesion. **Figure 4** shows an imbibition graph demonstrating a typical result from experiments using the 1 mM calcium calcifying fluid containing fluoride ions. The body of the lesion for the control extends 320 μm into the enamel. After exposure to the calcifying fluid for five six-minute exposure periods the body of the lesion on the test half was only 200 μm deep to the enamel surface. Of greater significance was the reduction in porosity and size of the body of the lesion. When the 1 mM calcium calcifying fluid was used without the addition of fluoride ions, the mean reduction in area of the body of the lesion for 10 lesions selected at random was found to be 22 per cent. When fluoride was added to the calcifying fluid, the reduction in size of the lesion was dramatic, irrespective of the level of fluoride ions added to the calcifying fluid. The mean reduction found for the 10 lesions examined was 72 per cent **(Table 2)**. No further increases were found when the fluoride concentration was increased 10 times.

Figure 5 shows a microradiograph of a lesion examined after remineralization with the 1 mM calcium calcifying fluid containing fluoride. The lesion appears as a series of alternating radiolucent and radiopaque laminations, an appearance typical of lesions remineralized in depth.

With respect to exposure times, maximum changes with any one set of conditions occurred by the tenth exposure. However, approximately 80 per cent of the final degree of remineralization achieved occurred after the fifth exposure period. The least effective conditions were found to be when a single one-hour exposure period was used.

When surfaces of lesions remineralized with the 1 mM calcium calcifying fluid were examined with the scanning electron microscope no crystal deposits were seen. This was in contrast to the crystalline precipitates seen when the 3 mM calcium calcifying fluid was used.

Therefore the experiments showed conclusively that small intact surface lesions in human dental enamel were able to remineralize *in vitro*. When the calcium concentration of the calcifying fluid was adjusted to 3 mM, remineralization was limited to the superficial layers of the lesion. Reducing the calcium level to 1 mM resulted in remineralization occurring throughout the entire depth of the lesion. The addition of fluoride ions to the synthetic calcifying fluid had a marked effect in enhancing remineralization. When the low-calcium fluid was used without the addition of fluoride, a 22 per cent reduction in area of the body of the lesion was obtained. This reduction increased to 72 per cent on the addition of 0.05 mM fluoride (1 ppm). Increasing the fluoride level beyond this concentration had no further effect upon the degree of remineralization achieved. Similar results were reported previously when exposure periods measured in hours were employed instead of the six-minute increments used in these

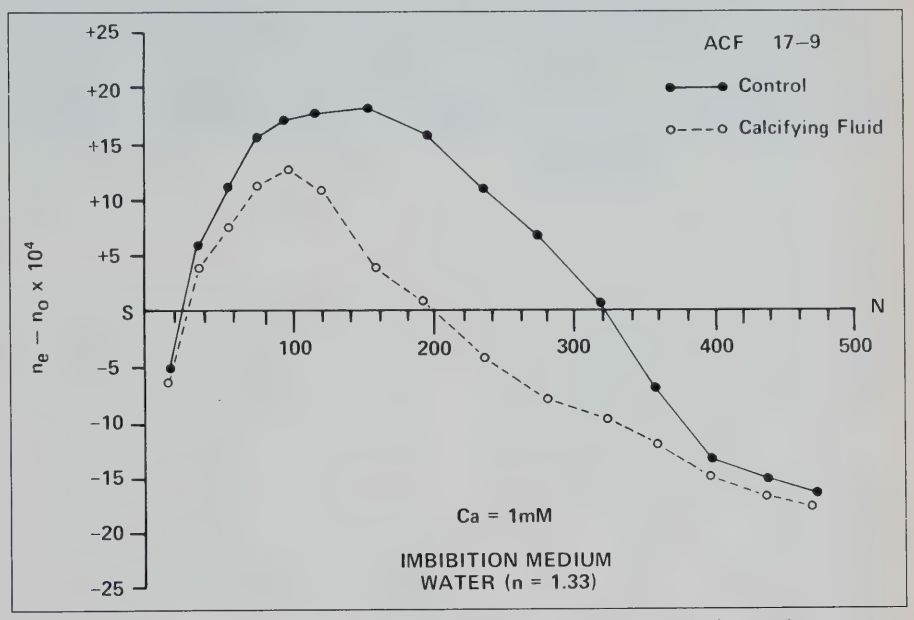

Fig. 4. *Imbibition graph showing the effect of exposing an enamel lesion to the 1mM calcium calcifying fluid containing fluoride ions. The abscissa shows depth from the enamel surface; the ordinate indicates observed birefringence. The body of the lesion for the control extends 320 μm into the enamel whereas in the test half of the lesion, the body extends only 200 μm. Of greater significance is the large reduction in porosity of the body of the lesion relative to the control.*

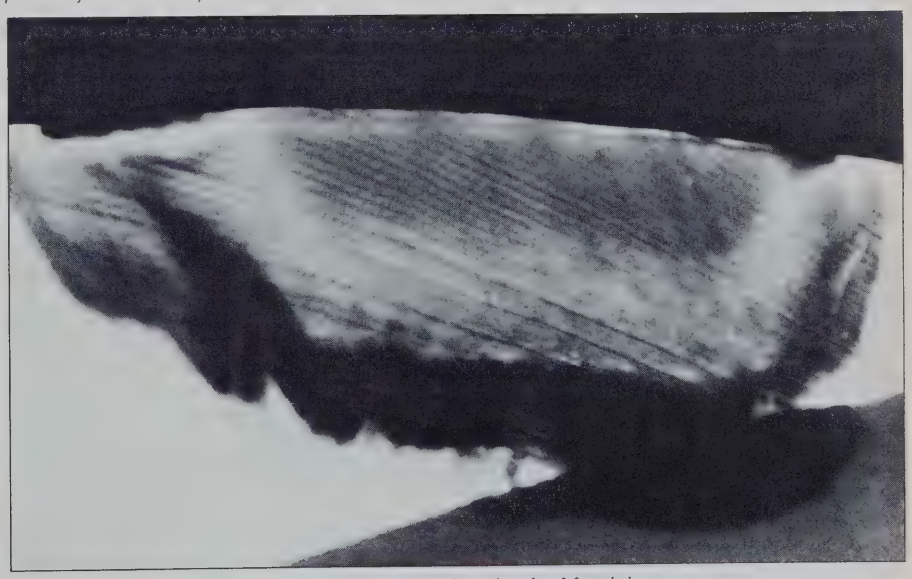

Fig. 5. *Microradiograph of a lesion exposed to the 1mM calcium calcifying fluid. The lesion shows a series of radiolucent and radiopaque laminations, indicating zones of remineralization.*

studies (Silverstone, 1982). It is of significance to note that comparable degrees of remineralization occurred when exposure increments of either six-minutes or one-hour were employed. This indicates that six-minute exposure increments are a sufficient time frame to initiate the remineralization mechanism. What appears more important than "time" of exposure to the calcifying fluid is the "number" of exposure increments employed.

After exposure to the 3 mM calcium calcifying fluid the surface layer showed clusters of plate-like material growing from the enamel structure. The morphological appearance of this material was similar to dicalcium phosphate dihydrate (DCPD) or octacalcium phosphate (OCP) crystals. These crystals were never found when the 1 mM calcium calcifying fluid was used. Previous studies on the supersaturation of these calcifying fluids have shown that with the 3 mM fluid several of the more acidic calcium phosphate phases were supersaturated in addition to the apatitic phases (Silverstone and Wefel, 1981). The rapid nucleation of these larger acidic calcium phosphates tend to precipitate onto the enamel surface and block the surface pores, thus limiting remineralization to the superficial part of the lesion. With the 1 mM calcium calcifying fluid, only the apatitic phases were supersaturated and remineralization occurred throughout the total depth of the lesion.

EFFECT OF REMINERALIZATION ON ENAMEL CRYSTALS

With the introduction of ultrastructural techniques in caries research it was hoped that direct visualization of the diseased tissue would help to solve some of the problems unresolved by studies at the light microscope level. However, this has not proved to be the case due, in part, to problems associated with preparing ultra-thin sections from such a hard tissue, as well as identification of the exact site in the lesion when examining samples at the ultrastructural level. In addition, because of the inevitable oblique transverse cutting of enamel prisms, the crystals too are cut in various oblique transverse planes. Thus, studies with the transmission electron microscope can give the erroneous appearance that crystals have diameters greater than their true dimensions (**Figure 6**). This is one of the reasons for the confusion relating to crystal dimensions in both sound and carious enamel as evidence in the literature.

The mineral component of enamel is a basic calcium phosphate resembling hydroxyapatite. This biological apatite contains ions such as carbonate, chloride, fluoride, magnesium, sodium and potassium in addition to the major constituents of calcium and phosphate. The Ca/P molar ratio is approximately 1.64 compared to that of pure synthetic hydroxyapatite which is 2.15, and thus the mineral phase can be described as non-stoichiometric. There is some agreement as to the dimensions of crystals in mature sound enamel.

The length of crystals is difficult to determine since they are fractured during speci-

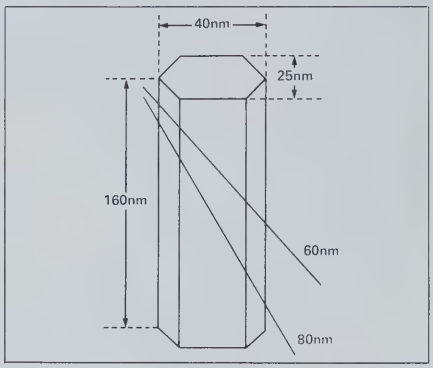

Fig. 6. *Diagram of a typical crystal in mature sound human dental enamel. Two planes of sectioning have been inserted in the crystal in an oblique transverse direction. It can be seen that examining such a crystal with transmission electron microscopy cut in either plane would give the erroneous impression that the crystal diameter was greater than its true diameter. The most oblique cut indicated in the diagram would suggest a crystal diameter of double the true dimension.*

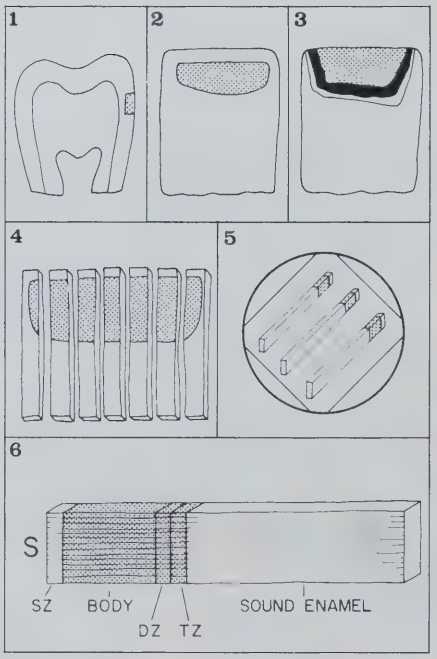

Fig. 7. *Diagrammatic representation of the experimental regimen used in the new micro-dissection/high resolution SEM technique.*

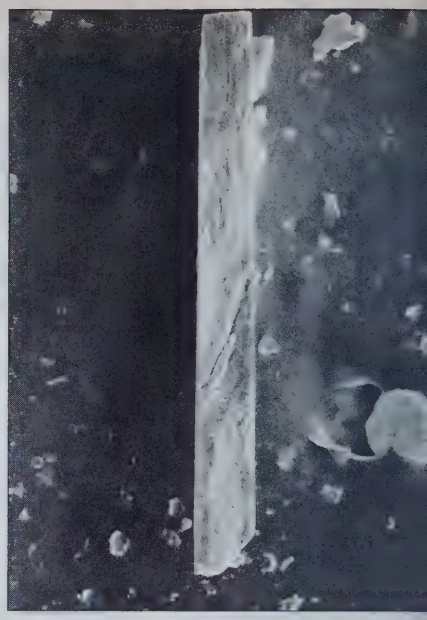

Fig. 8. *Scanning electron micrograph of a single enamel spicule showing, at low magnification, the width of the fractured specimen. These varied from 50-80 μm, corresponding with section thickness. The width of this specimen is 75 μm.*

Fig. 9A. *Four spicules have been mounted on copper tape on an SEM stub. The relative sizes can be assessed from the part of a finger and thumb indicated in the illustration. The specimens can be seen quite easily due to the fact that they have been coated.*

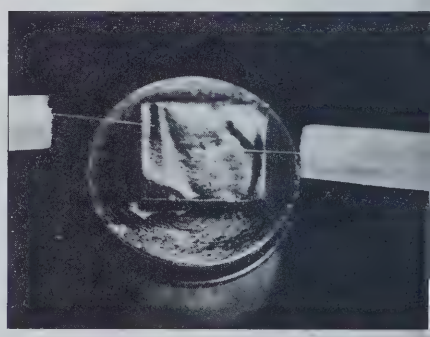

Fig. 9B. *This illustrates the technique of maintaining the slivers in an upright position so that the bases adhere to the copper adhesive tape. The "appliance" consists of a single nylon strand which is used to position each enamel sliver under direct vision with a binocular microscope.*

300 μm

Fig. 10. Scanning electron micrograph from a coated spicule showing the junctional region between the translucent zone and the dark zone. Crystal diameters in the translucent zone (left side and lower region) are seen to be considerably smaller than those in the adjacent dark zone.

men preparation. However, it is generally believed that they can be as long as 0.5–1.0 μm. In transverse section the crystals are flattened hexagons having a diameter ratio of approximately 2:1. There is general agreement concerning these dimensions when examined by either transmission electron microscopy (TEM) or scanning electron microscopy (SEM). The larger diameter of the crystal has a range of 35–43 nm (Silverstone and Wefel, 1981; Frank, Sognnaes and Kern, 1960; Glas and Nylen, 1965; Ronnholm, 1962; Kerebel and Daculsi, 1976; Arends and Jongebloed, 1979). However, other workers have recorded crystal diameters for sound human enamel of up to 120 nm when using TEM techniques. These measurements could well be inaccuracies arising as a result of measuring crystals cut in various transverse oblique directions.

With respect to carious enamel, most workers agree that there is a significant reduction in crystal size relative to sound enamel. Crystals within the lesion show either surface etching or a preferential dissolution along the long or C-axis, both defects resulting in a reduction in crystal diameters. The majority of information obtained to date is derived from transmission electron microscopy studies of advanced lesions from which ultra-thin sections are obtained more easily than from very small lesions where the tissue is almost as hard as sound enamel. Scanning electron microscopy has also been used in the examination of both sound and carious enamel in an attempt to determine crystal parameters. While groups or clumps of crystals can be seen in fractured material, it is nevertheless difficult to resolve individual crystals. Another major problem is the exact orientation of that part of the specimen under examination. Before statements can be made relating crystal changes with various areas within a lesion it is absolutely essential to know exactly where in the lesion one is examining. Also, in the eventual measurement of single crystals, the presence of relatively thick layers of gold-palladium added during the vacuum coating stage adds to the inaccuracies. Therefore, a new technique was developed to overcome the above problems (Silverstone, 1983).

Longitudinal ground sections were prepared through both natural lesions of enamel caries and artificial caries-like lesions produced in acidified gels. The histological features of the lesions were recorded including the exact depth of each zone from the enamel surface at various points. In addition, the width of the zones was also recorded and all of these measurements were carried out using various imbibition media.

The experimental regimen is shown diagramatically in **Figure 7**. Lesions were carefully dissected from the ground section using a modified scalpel blade under direct vision between crossed polars in a dissecting microscope (**Fig. 7;1, 2 & 3**). The small pieces of tissue containing the lesion were photographed in various media using polarized light (**Fig. 7; 2 & 3**). Each lesion, together with the adjacent sound enamel, was then dissected into a series of small longitudinal slivers (**Fig. 7; 4**). This was accomplished by pressure on the scalpel blade causing the tissue to fracture along the prism structure. The slivers were then mounted on an SEM stub with the *fractured edges uppermost* (**Fig. 7; 5**). The widths of the fractured surfaces varied from 50-80 μm (**Fig. 8**). Since each spicule had been examined in detail in polarized light, the exact depth and width of each zone was known. In this manner any point in the lesion could be located accurately with the SEM by measurement from the enamel surface in each sliver at low magnification (Fig. 7; 6). Thus, points within each histological zone as well as sound enamel could be identified at conventional magnifications before switching to ultrastructural levels. **Figure 9A** shows an SEM stub containing four spicules. Since the specimens have been coated with platinum they are easier to detect than prior to the coating procedure. An indication of their size can be made in relation to the finger and thumb included in the illustration. **Figure 9B** shows the technique of maintaining the slivers of enamel upright so that the bases adhere to the copper tape on the SEM stub.

Specimens were examined at high resolution, up to 60,000 diameters, using a Jeol JSM 35C SEM. For this, specimens were vacuum coated with very thin layers of platinum, of the order of 5-7 nm, the thickness being checked by coating latex calibration spheres having diameters 80±5 nm. A Quantimet Image Analyzer was used to measure crystal diameters from electromicrographs taken in the various zones of the lesion as well as in sound enamel.

DISCUSSION

The experiments showed that for sound enamel, crystal diameters were found to be in the range 35-40 nm. For the sake of convenience, all crystal measurements have

Fig. 11. *Scanning electron micrograph showing one prism from the region of the dark zone. The crystals can be seen quite clearly.*

1 μm

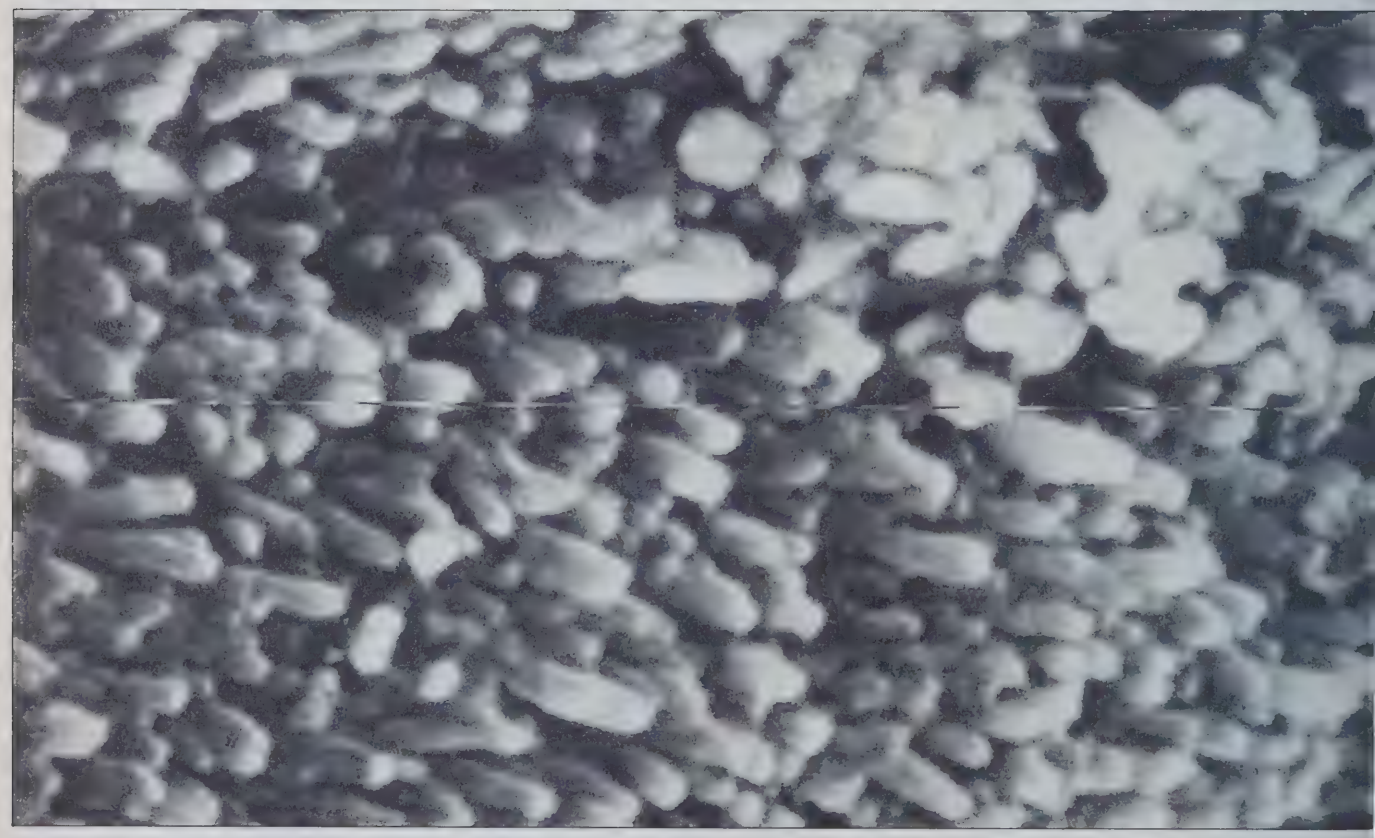

Fig. 12. *Scanning electron micrograph showing crystals within the dark zone of the lesion. Crystal diameters are significantly greater than for sound enamel, having size ranges from 50-100 nm. All of the crystals appear to be within this size range.*

500 μm

been rounded off in increments of 5 nm. In the translucent zone of the enamel lesion, crystal diameters were smaller than for sound enamel and varied from 25-30 nm. There was a very definite junctional region between the translucent zone and the dark zone (**Fig. 10**).

Figure 11 is a scanning electron micrograph showing one prism from the region of the dark zone. The crystals are seen quite clearly; they were significantly greater in diameter than those of the sound enamel. **Figure 12** is a high power view of crystals from within the dark zone. They vary from approximately 50-100 nm in diameter. In the body of the lesion crystal diameters were found to be much smaller, in the range 10-30 nm. In the surface zone, crystal diameters were once again found to be larger than in sound enamel, being in the range 40-80 nm.

These size ranges were calculated on the basis of several hundred measurements in each of the zones of the lesion. The thin coating of platinum made it possible to measure accurately crystal diameters. The measurements quoted above do not include the thickness of the coatings.

Crystal diameters within a small lesion were always found to be within the size ranges stated above irrespective of whether the lesion was a natural one or an artificial one created with our acidified gel technique. The relative crystal sizes are shown diagramatically in **Figure 13**.

This new information with respect to the enamel lesion is of significance because it is the first DIRECT evidence of remineralization occurring throughout the prism structure within the enamel lesion. Such crystal growth to produce large single crystals could have resulted from the fusion of remnants of several of the original crystals. Thus, although there is a significant increase in crystal diameter, the total number of crystals within a particular zone is likely to be reduced. Due to the more favorable surface area to volume ratio, this effect by itself will result in a reduction in dissolution rate. In addition, crystal growth occurred in the presence of fluoride and so a more stable fluor-hydroxyapatite unit is likely to result. These facts help explain previous work where we demonstrated that remineralized lesions were more resistant to lesion progression *in vitro* relative to control lesions. In addition, the two zones where large crystals have been found, the dark zone and the surface zone, are the two zones of the lesion which are produced as a result of remineralization (Silverstone, 1977).

Previous examination of carious enamel with the transmission electron microscope has recorded the presence of a single row of large crystals around the prism junction in the body of the lesion (Johanssen, 1965; Johnson, 1967). These crystals have been described as being larger and more electron-dense than crystals in the sound enamel and thought to be the result of remineralization, or crystals of sound enamel not affected by dissolution. This single row of large crystals occurs in the body of the lesion and is not to be confused with the large crystals found in this study in the surface zone and the dark zone of the carious lesion. These latter crystals, found during the use of this new micro-dissection/high resolution SEM study, appear to affect all of the crystals throughout the entire prism structure within the relevant zones.

Previous studies have also found large crystals in lesions after experimental remineralization *in vitro*. Ten Cate and Arends (1977) used bovine enamel and stated that after remineralization of acid buffer lesions, crystals having diameters of 200 nm were seen. In contrast, Arends and Jongebloed (1979) reported crystal diameters for bovine enamel remineralized *in vitro* and *in vivo* as being 97 and 63 nm, respectively. In spite of the different crystal sizes reported from this group, it is nevertheless difficult to extrapolate findings from bovine enamel to human enamel since it is more porous and less regular in structure than human enamel (Featherstone and Silverstone, 1981). This is one of the reasons why only mature human enamel was used in the present studies. In studies by Silverstone and co-workers (1981) crystal diameters in the body of the lesion were found to be within the range 10-30 nm. Examination of comparable areas in remineralized lesions of human dental enamel showed that after exposure to a low calcium calcifying fluid there was a significant increase in crystal diameters.

Figure 14 is a scanning electron micrograph from a lesion after exposure to a calcifying fluid containing 1 mM calcium together with 0.5 mM fluoride. This region corresponded with the body of the lesion on the control. After remineralization, there has been a significant increase in crystal diameters from 10-30 nm to 50-100 nm. **Figure 15** is a high power scanning electron micrograph from the dark zone of a lesion after remineralization with the 1 mM calcium calcifying fluid containing fluoride ions. Single crystals can be seen at a magnification of 60,000 diameters and such crystals vary in diameter from approximately 100-150 nm. **Figure 16** shows diagramatically the crystal sizes in a lesion after remineralization *in vitro* with the low calcium calcifying fluid containing fluoride ions.

Thus, previous studies have recorded large crystals in a single row at prism junctions in carious enamel, and in lesions after exposure to various calcifying fluids *in vitro*. This study is the only one where it has been recorded that all crystals within two of the four zones of the enamel lesion are significantly larger than those of the sound enamel. In addition, after remineralization of the lesion *in vitro*, it has been possible to increase significantly crystal diameters throughout the entire lesion.

Recent evidence supports the contention that one of the chief mechanisms whereby fluoride reduces caries incidence is by remineralization. Small enamel lesions confined to the enamel in the interproximal regions cannot be detected by conventional clinical or radiographic techniques (Silver-

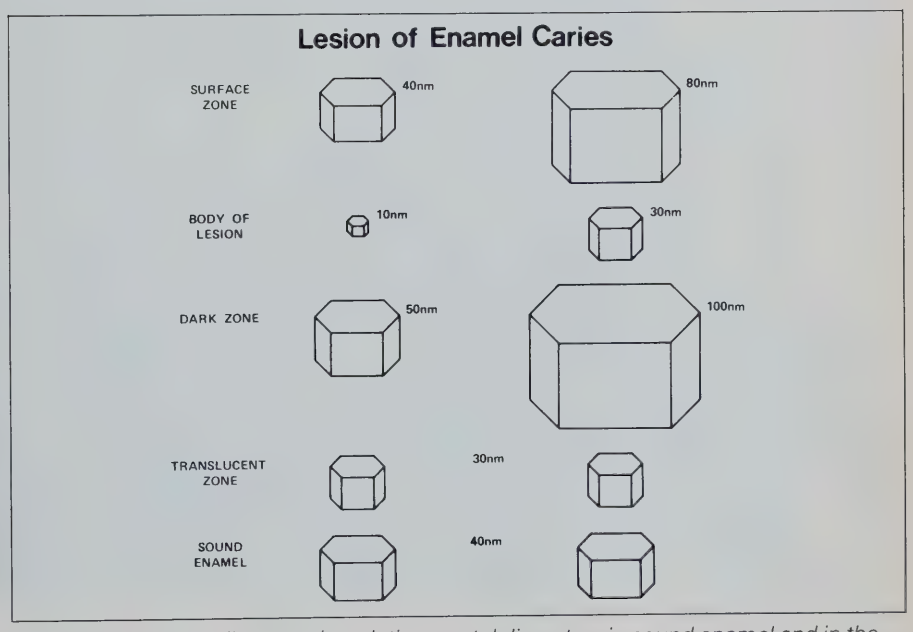

Fig. 13. *Diagram to illustrate the relative crystal diameters in sound enamel and in the four histological zones of the enamel lesion.*

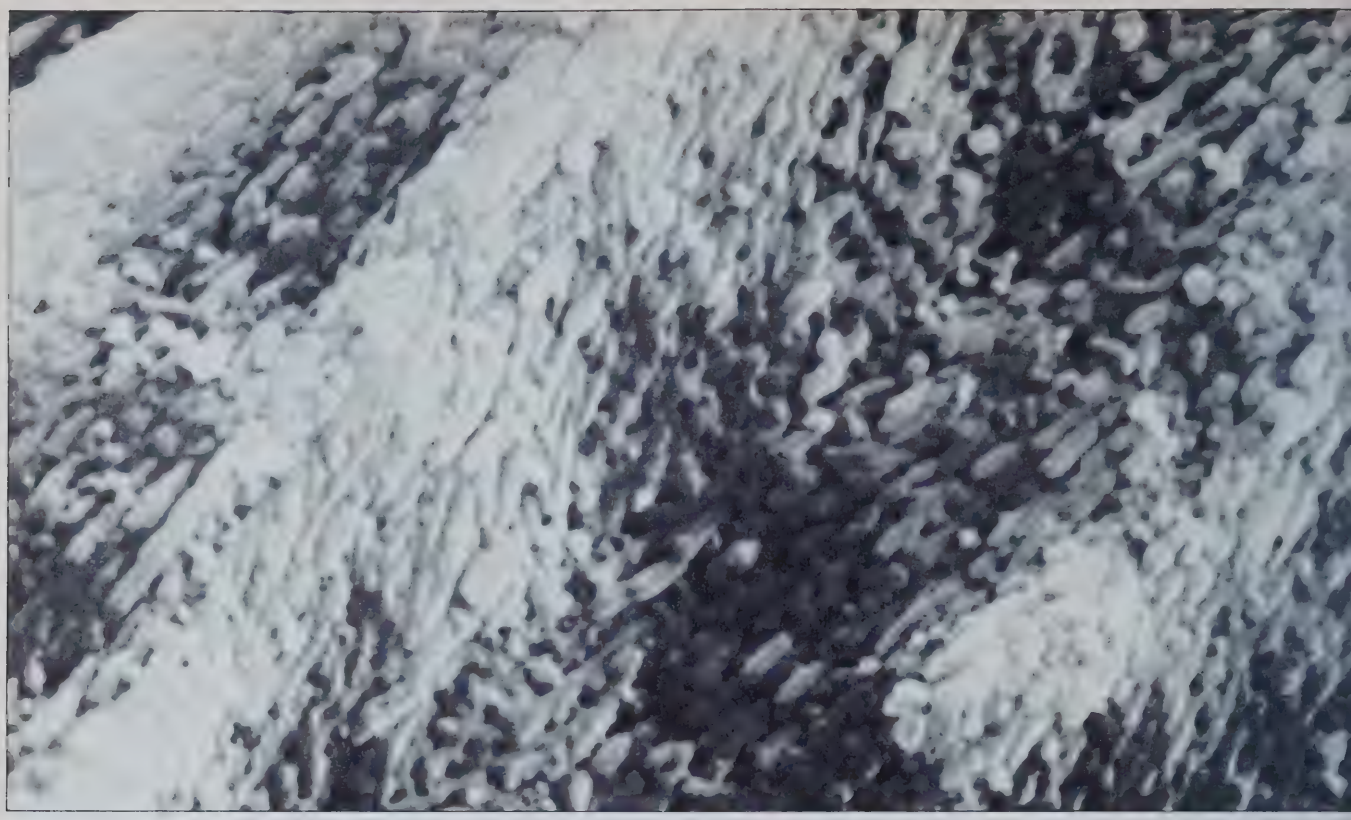

Fig. 14. *Scanning electron micrograph from a lesion after exposure to a calcifying fluid containing 1mM calcium plus 0.05mM fluoride. This region corresponded with the body of the lesion on the control. There has been a significant increase in crystal diameters from 10-30 nm to 50-100 nm.*

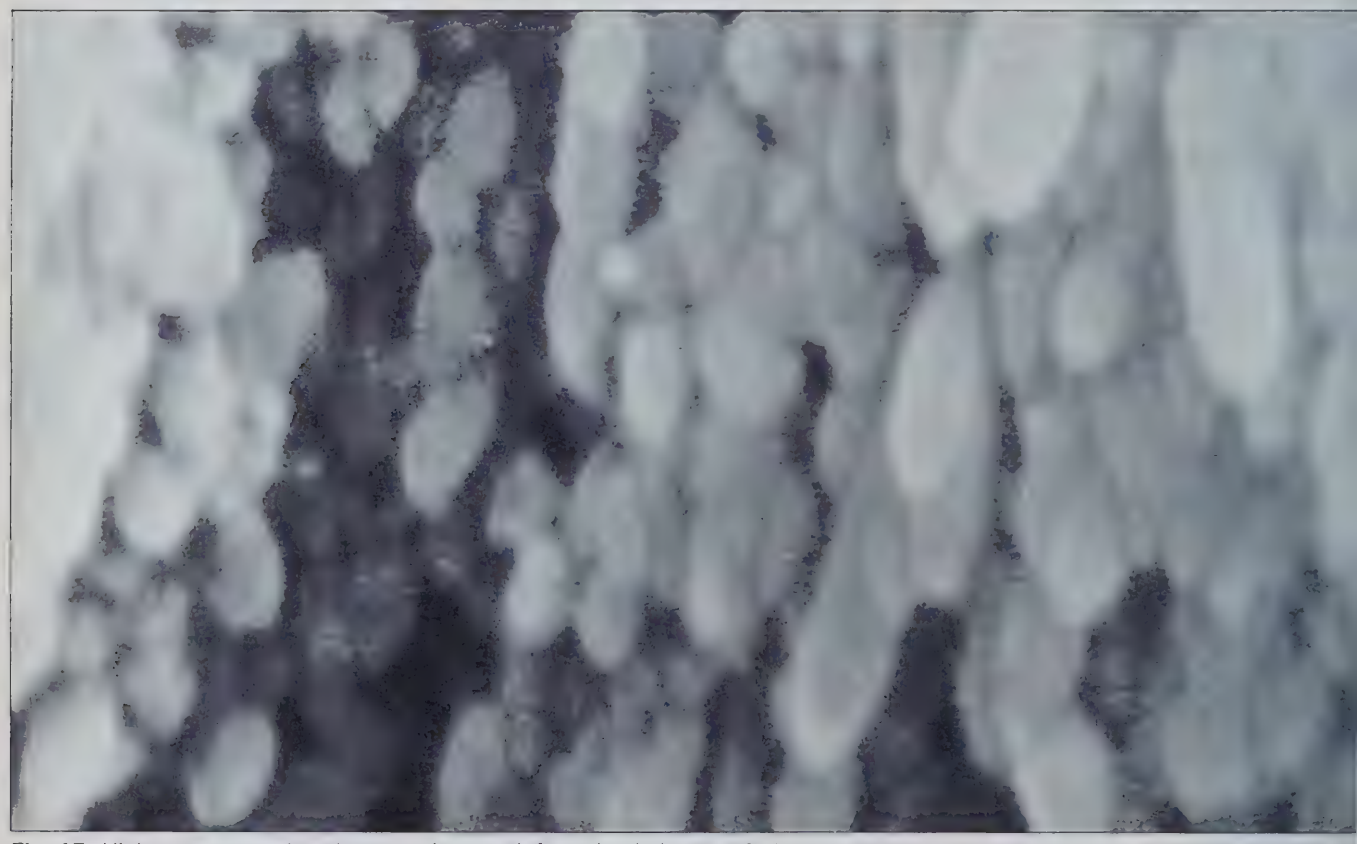

Fig. 15. *High power scanning electron micrograph from the dark zone of a lesion after remineralization with the 1mM calcifying fluid containing fluoride ions. Single crystals can be seen with diameters within the range 100-150 nm.*

tone, 1982). Thus, regions of enamel with uch lesions are diagnosed as sound tissue. : is into these demineralized areas that uoride is concentrated whereby they act s fluoride ion reservoirs and favour remin-ralization. Therefore it is possible that in "caries-free" patient, many interproxi-ıal enamel regions could have small sions which are maintained at their his-ological sub-clinical size by continued emineralization. If fluoride is not available, sions can progress in size to become etectable either clinically or by radio-raphy. Once lesions are diagnosed, pre-entive techniques employing fluoride hould be instituted, or concentrated, so as o favor remineralization. Lesions can then egress so as to "disappear" from radio-raphic detection. Although the use of luorides is important in enhancing remin-ralization, it does not appear to be neces-ary to use high concentrations. Recent linical studies have supported the frequent upply of low concentrations of fluoride ather than the infrequent use of high con-entrations. The results of this study sup-ort this contention since the maximum egree of remineralization occurred with a ow fluoride concentration of 0.5 mM 1 ppm) available at the enamel surface. ncreasing the fluoride level ten times had o effect on the degree of remineralization chieved. Since it can take three or four ears for a smooth surface lesion to pro-gress to the stage where the dentin is nvaded, there is adequate time to intercept he carious process.

This study has also demonstrated the resence of crystals in two of the four zones f the enamel lesion having diameters ignificantly larger than those of the sound namel. This is the first report showing that he crystals within the dark zone and the urface zone of the enamel lesion have been ffected by crystal growth. Thus, it appears hat the initiation of a small sub-clinical esion in the outer enamel paradoxically ids in preventing its progression. Firstly, y preferentially taking up significantly nore fluoride than adjacent sound enamel. The lesion therefore acts as a fluoride ion eservoir and, during dissolution when alcium and phosphate ions are released, he presence of fluoride ions within the esion favors remineralization. Secondly, if pace was not available in the densely nineralized tissue, it would not be possible or crystal growth to occur. In addition, the tudy has also shown that if the lesion is xposed to a calcifying fluid, further remin-eralization of the lesion occurs which ncreases crystal diameters throughout the ntire lesion. These studies have important mplications in terms of understanding nechanisms of caries prevention as well as he development of new preventive agents.

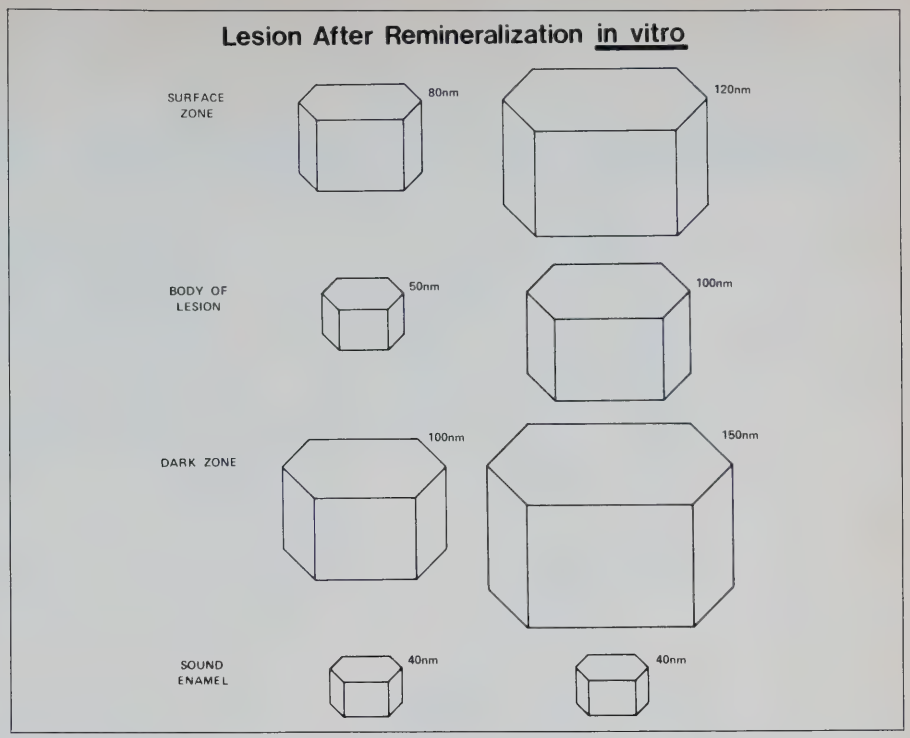

Fig. 16. *Diagram to show crystal diameters in a lesion after exposure to the low calcium calcifying fluid containing fluoride ions.*

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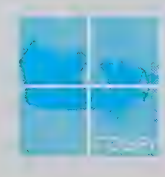

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POSSIBILITIES FOR MODIFYING THE CARIES ATTACK BY ALTERING THE ORAL MICROFLORA

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Department of Oral Biology
Faculty of Dentistry
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ABSTRACT

Dental plaque and in particular its composition in localized areas can be related to the development of carious lesions. As dental plaque is a bacterial community, its composition reflects its environment. Therefore when the pathogenic components of a community, or the pathogenic community have been identified, control of the disease may be approached by modifying the microflora through changes in the environment. At the simplest, and perhaps the most desirable level the plaque community can be controlled through diet modification. Alternatives to this strategy are the introduction of changes into the environment which either eliminate the pathogens or reduce the expression of pathogenicity of the community. Examples of both of these strategies exist, in the former, attempts to eliminate cariogenic bacteria from the community have been made using chlorhexidine, antibiotics and iodine. The latter strategy is typified by the introduction of fluoride into the habitat. Fluoride has well known effects on enamel and remineralization, however, its ability to reduce acid production by plaque will remove ecological advantages afforded aciduric bacteria in areas of plaque exposed to high levels of carbohydrate. Modification of the microflora of plaque to prevent the development of a carious lesion is possible and must not be regarded as a future strategy but one of the present. Measures directed at the microflora of caries, together with other caries preventive strategies must be seen as a significant component of dental practice in the immediate future.

RÉSUMÉ

Il existe une corrélation entre la plaque dentaire, et en particulier sa localisation dans des aires déterminées, et le développement de lésions carieuses. Étant donné que la plaque dentaire consiste en une agglomération de bactéries, sa composition est fonction de son environnement. Par conséquent, lorsque les composantes pathogènes de l'agglomération, ou la totalité de cette agglomération pathogène, ont été identifiées, on peut commencer à contrôler les maladies en modifiant la microflore au moyen de changements de milieu. La stratégie la plus simple, et peut être la plus désirable consiste à contrôler l'agglomération de la plaque en modifiant le régime alimentaire. D'autres stratégies consistent à introduire des changements de milieu qui éliminent les éléments pathogènes, ou qui réduisent le pouvoir pathogène de l'agglomération. Il existe des exemples de ces deux stratégies: on peut essayer d'éliminer les bactéries cariogènes en utilisant la chlorhexidine, les antibiotiques, et l'iodine. On peut d'autre part introduire du fluorure dans le milieu. Le fluorure a des effets bien connus sur l'émail et la reminéralisation, mais son pouvoir de réduire la production acide de la plaque annule ses avantages écologiques en introduisant des bactéries aciduriques dans les aires où la plaque est exposées à des niveaux élevés de carbohydrates. On peut modifier la microflore de la plaque pour prévenir le développement de lésions carieuses, et on ne doit pas considérer cette méthode comme étant du domaine de l'avenir, mais comme une méthode actuelle. Les mesures visant à combattre la microflore carieuse, ainsi que les autres méthodes préventives, seront des méthodes très utilisées par la médecine dentaire dans un proche avenir.

INTRODUCTION

At the outset, in order to appreciate the potential for eliminating, controlling or preventing caries, the disease must be considered in all its aspects. During this symposium, various defined areas of the aetiology of caries were examined by a succession of speakers. There is always a tendency for a speaker to dwell enthusiastically on his topic, sometimes to the exclusion of all else. In this way, the meeting might be likened to a street market with each speaker attempting to attract the participants to his wares as the most appealing and effective. Caries is a dynamic process involving the teeth, microflora, host responses, host physiology and the chemistry of enamel. None of these areas is more significant than another in the disease process. Although this article is limited to the microflora of caries, the bacteria cannot be looked at in isolation but must be seen as one component of the destructive process. When control of caries as a public health measure or in the dental practice is considered, all methods must be exploited.

DISCUSSION

Effective control of caries by modification of the microflora depends on an understanding of the structure and development of dental plaque. Dental plaque develops on the tooth surface as the result of the

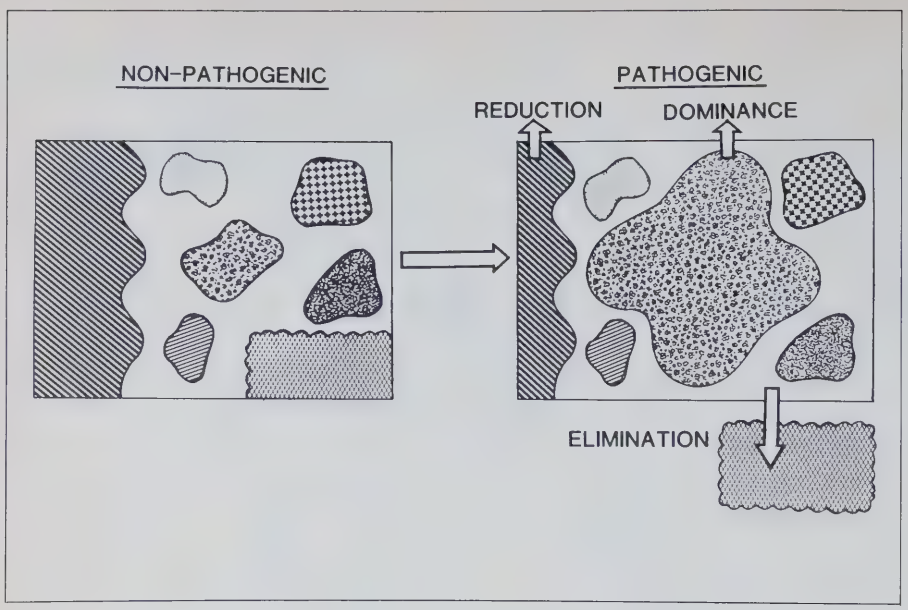

Fig. 1 *The growth of a population of microorganisms in a bacterial community to a point of dominance.*

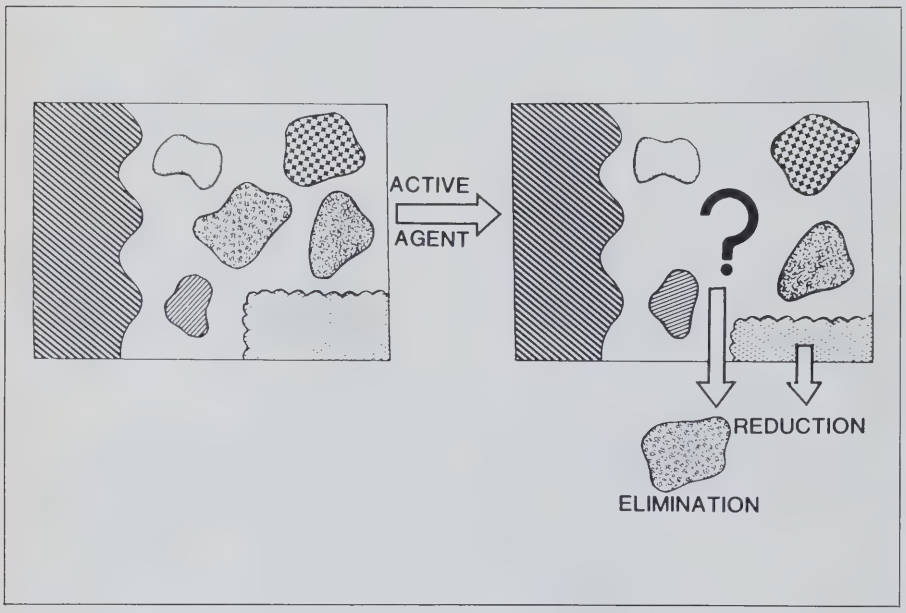

Fig. 2 *The effect of the application of a specific antibacterial on a microbial community.*

TABLE 1

The percentage contribution of Streptococcus mutans and Lactobacillus to viable counts of samples from susceptible sites on the teeth of Canadian Indian children with nursing caries.

Subject	Lesion	Organism	Samples during 1 yr.					
			1	2	3	4	5	6
DS Site 1	developed	S. mutans	7.5	37.0	63.0	84.0	NS[a]	NS
		Lactobacillus	0	0	26.0	0.5	NS	NS
Site 2	absent	S. mutans	1.5	36.0	44.0	24.0	NS	NS
		Lactobacillus	0	0	27.8	0	NS	NS
CH Site 1	developed	S. mutans	0	27.0	39.0	8.0	18.0	18.0
		Lactobacillus	0	0	7.0	4.0	12.0	9.0
Site 2	absent	S. mutans	0	64.0	2.0	13.0	0	0
		Lactobacillus	0	0	0	0.2	14.0	0

a) NS = No sample.

succession[1] of bacterial populations whic leads to a bacterial community[2]. The com position of the community will depend, the main, on two factors: (a) The ability the bacteria to colonise either pellic covered enamel or other bacteria whic have previously colonised the tooth[3], an (b) the ability of the bacteria to grow on th surface in competition with the other mem bers of the community. Bacteria can be su cessful within the community when the have special characteristics which enabl them to suppress their competitors e.g bacteriocins[4] or allow them to take advan tage of an environmental feature e.g. acido genicity[5]. In some situations, one specie can have such an advantage that it wi become a major component of the commu nity in a localized area, this phenomeno is spoken of as dominance[6]. The patho genic potential of a species may be mor obviously expressed when it is dominan than when it forms a lesser part of th community. In achieving dominance, th species may cause a reduction or eve eliminate other members of the communit **Figure 1**. The concept of dominance of th dental plaque community by potentiall pathogenic bacteria is the most easil understood of the relationships of the ora microflora to caries.

If dominance of the community by cario genic bacteria can occur in caries, which ar the potential pathogens? The species, o group of species *Streptococcus mutans* i undoubtedly the most significant of th cariogenic microorganisms present in th mouth[7]. However, the genus *Lactobacillu* has a significant role to play and other bac teria are certainly involved but probably t a lesser extent[7]. The ability of a species t dominate the plaque community depend to a great extent on the oral environment There is a very good example of a chang in the environment leading to dominanc by *S. mutans* and to colonization by lacto bacilli in xerostomia[8]. However, the effec of a reduction in saliva is generalized an the situation is far from normal. In suppor of the concept of dominance in normal sub jects, most of the studies both longitudinal and cross sectional, of the microbiology c caries have shown increases in *S. mutan* associated with caries lesions[7]. *Lacto bacillus* has also been shown to be associ ated with the development of lesions[7] an more recently with the progression of inci pient lesions[9]. However, dominance b itself may not necessarily be sufficient t cause a carious lesion. In **Table 1**, som data from a recent study[10] of nursin caries is shown which emphasizes thi point. In both subjects (DS and CH) carie lesions occurred on one susceptible sit (Site 1) but were absent on the othe (Site 2). Yet, high levels of *S. mutans* an

actobacillus occurred on both sites. These ata suggest that other, localized features f the environment influenced the produc- ion of a lesion. It is apparent, therefore, hat the environment plays a significant ole in the disease and this role can be ndependent of the microflora.

Given a role for the microflora and he environment, how can we attempt to ontrol the disease. The methods aimed at ontrol of the community can be of two ypes: (a) modification of the composition f the plaque community and (b) modifica- ion of the pathogenic activities of the laque community. The mechanism of limination of a potentially pathogenic pecies from plaque by means of an 'active gent' is depicted in **Figure 2**. The ques- ion mark in the diagram draws attention o the possibility that the elimination of one opulation from the plaque may allow an- ther to occupy the vacant area or function. t is a possibility, but rather a remote one, hat another pathogen will assume the lace in the community. The use of various gents to eliminate or suppress *S. mutans* as recently been reviewed by Loesche[11]. *actobacillus* might be more difficult to con- rol as members of this genus can be resis- ant to fluoride and chlorhexidine[12,13]. Another possibility for control of plaque omposition which is receiving attention is he use of a vaccine against *S. mutans*[14]. n this approach, the control would be xerted on colonization, preventing the stablishment of *S. mutans* in the mouth. do not wish to deal in detail with this topic ut I would refer you to the excellent stud- es by Cohen, McGhee and Lehner and their oworkers[15,16,17].

Control of the pathogenic activities of he plaque community can be achieved by reventing dominance by a pathogen or by hanging features of the environment. Both f these effects may be produced by a modi- ication of the diet when reduction of carbo- ydrate will reduce plaque acid production with a concomittant reduction in the eco- ogical advantage afforded *S. mutans*. It is ikely that fluoride has a similar effect on he plaque community. Fluoride will reduce he ability of the bacteria in plaque to roduce acid, although they will grow in the resence of fluoride[18]. Consequently, even f the plaque is being supplied with carbo- ydrate, fluoride will reduce its effect on the ommunity. This effect is shown in **Fig- ure 3** where fluoride maintains the normal balance in the plaque community in the presence of carbohydrate. It should be noted however that it is likely that this beneficial effect of fluoride may be over- come if the carbohydrate challenge is very high.

When incipient lesions are monitored,

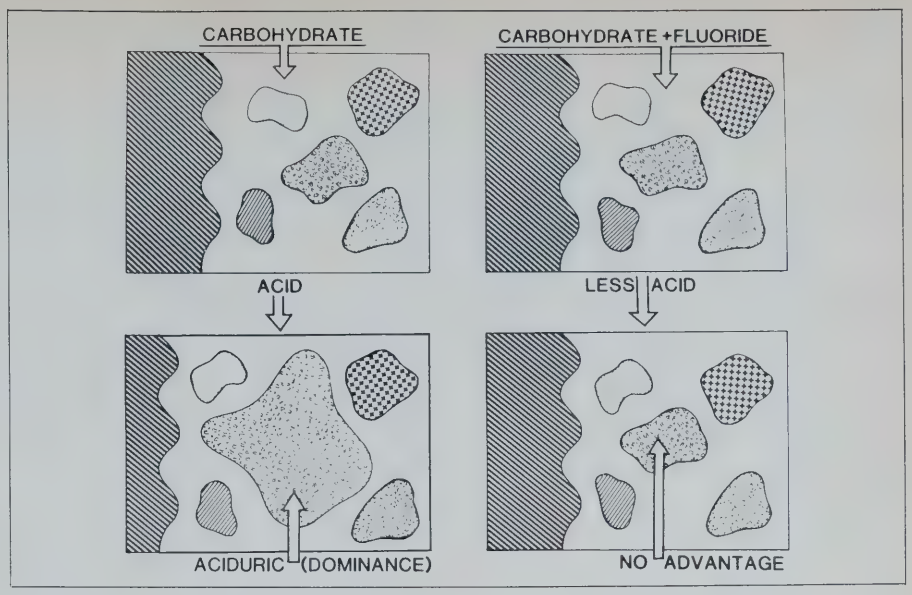

Fig. 3 *The stabilization of a bacterial community in the presence of carbohydrate by the application of fluoride.*

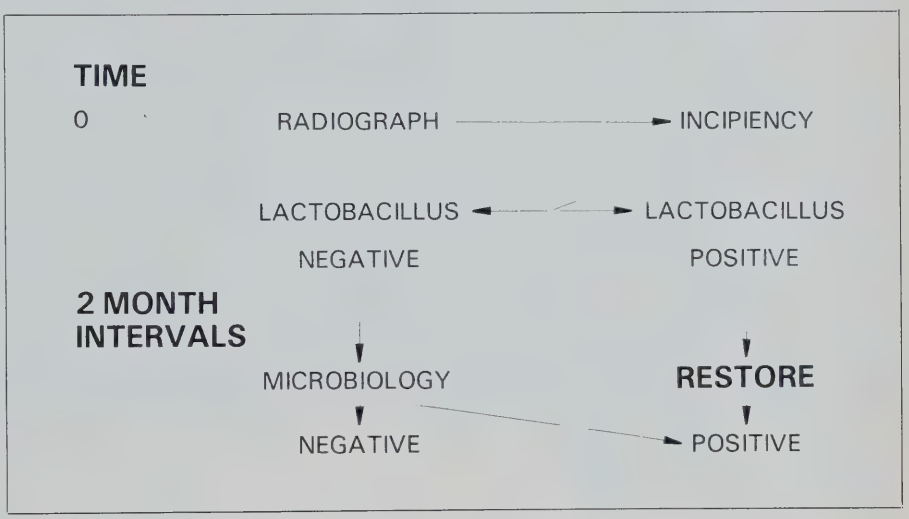

Fig. 4 *The sequence of sampling and the possible implication of the detection of* Lactobacillus *in association with incipient approximal lesions.*

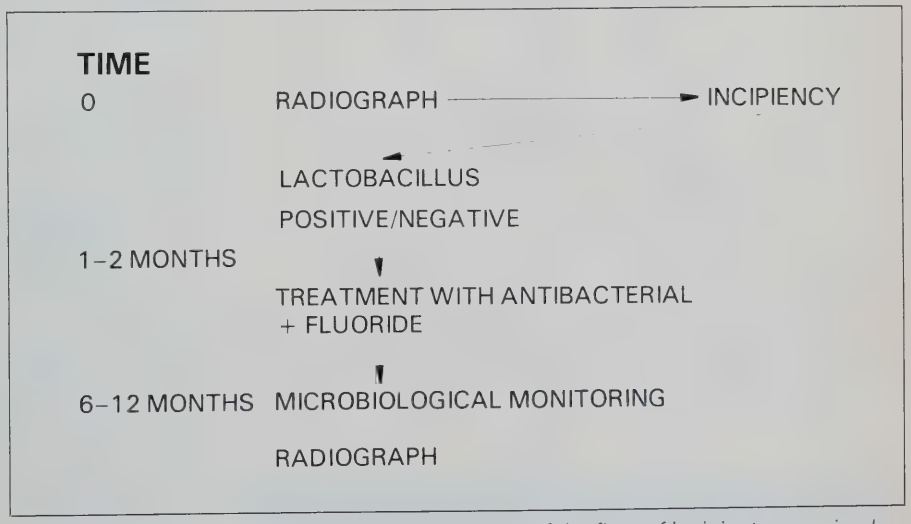

Fig. 5 *The sequence of microbiological monitoring of the flora of incipient approximal lesions including the use of an antibacterial with fluoride to control progression and encourage remineralization.*

about forty per cent of them do not progress to a point where they need restoration. It would be valuable if the clinician could identify those lesions which are at risk of progression in order to undertake preventive therapy. A recent microbiological study of the progression of incipient lesions[9,19] has shown that over 80 per cent of the progressive lesions were colonized by *Lactobacillus* before progression was diagnosed by radiograph. These data suggest that microbiological analysis of samples from incipient lesions could provide a valuable adjuvant to radiographs. If the presence of *Lactobacillus* indicates a lesion which cannot remineralize, restoration may be the necessary treatment. Conversely the absence of *Lactobacillus* could indicate the need for intensive fluoride treatments **Figure 4**. This approach may be taken further by using an antibacterial + fluoride regimen on incipient lesions to attempt to control the flora and promote remineralization **Figure 5**.

CONCLUSIONS

Dominance of certain areas of plaque by cariogenic microorganisms together with other environmental factors can lead to the production of a carious lesion. Control of the environment can reduce the dominance by *S. mutans* and *Lactobacillus* as environto these organisms. Control of the diet to reduce carbohydrate intake can be effective but is difficult to achieve. Elimination or reduction of the pathogens by antibacterials can be achieved in clinical practice. In addition to this, fluoride exerts an effect on bacterial acid production and through this on the level of aciduric bacteria in plaque.

The use of antibacterials and fluoride can provide effective control measures in clinical dentistry. This possibility is being explored for control of the progression of incipient lesions. Microbiological techniques to control the caries attack and also to provide information of value in the application of treatment are available today. Although these techniques may only be applied at this time in university departments, they will be applied in the dental office in the near future.

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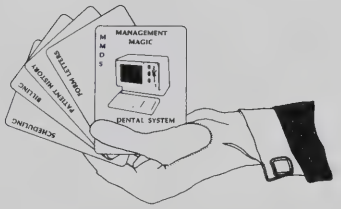

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Announcements

MARCH/MARS

March 5-7: La Commission d'études Biomatériaux créée par le Centre Français de la Corrosion (Cefracor) organizé à Strasbourg Germany au Palais de Conseil de l'Europe sur le thème « Corrosion et dégradation des biomatériaux et leurs incidences cliniques ». Pour tous renseignements s'adresser au Secrétariat du CEFRACOR, 28 rue St. Dominique, 75 07 Paris. Tel: 705-10-73 ou 705-39-26.

March 13-18: The First International Congress on dentistry, medical law and ethics will be held in Sedom, Dead Sea, Israel. Contact: Dr. S. Perlmutter, Chairman, Organizing Committee, First International Congress on Dentistry, Medical Law and Ethics, P.O. Box 394, Tel Aviv, Israel, 61003.

March 14-20: Canadian Association of Oral and Maxillofacial Surgeons annual convention, Banff, Alberta. Contact: Dr. R. E. Warren, Convention Chairman, # 2 St. George's Crescent, Edmonton, Alta., T5N 3M7, 403-451-5884.

March 16: Dental Horizons Inc will be giving a Seminar Entitled: "Effective Practice Management Techniques: The Ideal Practice" at New York University. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx New York, 10468, 212-933-5510.

March 17-24: International Dental Seminars announces the 11th International Alpine Dental Conference, Hotel Annapurna, Courchevel, 1850, France. Contact: International Dental Seminars, 24 Cadogan Square, London, SW1X 0JP, England.

March 18-30: Advanced Paedodontics Course 338. The British Council, London, Newcastle upon Tyne. Contact: The British Council, c/o The British High Commission, 80 Elgin St., Ottawa, Ont., K1P 5K7.

March 23: Dental Horizons Inc. will be giving a seminar entitled "Effective Practice Management Techniques: The Ideal Practice" at New York University. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, New York, 10468, 212-933-5510.

APRIL/AVRIL

April 2-4: NIH Consensus Development Conference on Osteoporosis, Masur Auditorium, Clinical Centre, National Institutes of Health, Bethesda, Maryland. Contact: Peter Murphy, Prospect Associates, 2115 East Jefferson St., Suite 401, Rockville, MD USA 20852.

April 4-8: Dental Horizons Inc will be presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice". Paradise Island, The Bahamas. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx New York, 10468. 212-933-5510.

April 6-7: The Royal College of Dentists of Canada Annual meeting with convocation and dinner, Montreal, Quebec. Contact: Kay Montgomery, Executive Secretary, The Royal College of Dentists of Canada, 170 St. George St., Suite 614, Toronto, Ont., M5R 2M8, 416-964-7263.

April 6-7: Canadian Academy of Restorative Dentistry annual meeting, Montreal, Quebec. Contact: Dr. Berl Mendel, # 216, 5757 Decelles Ave, Montreal, Que., H3S 2C3, 514-342-2549.

April 8-10: The Canadian Academy of Periodontology and the Society of Periodontists of Quebec, 1984 Annual Meeting, Montreal, Quebec. Contact: Dr. Allen Wainberg, Secretary, CAP, 5845 Cote des Neiges, Suite 300, Montreal, Quebec, H3S 1Z4.

April 8-12: Conjoint convention of the Canadian Dental Association and the Ordre des dentistes du Québec "Les Journées Dentaires 1984", Palais des Congrès, Montréal, Québec. Contact: Dr. Michel Jahjah, General Chairman, 3565 rue Berri, Bureau 200, Montréal, Québec, H2L 4G3, 514-842-9112.

April 24-26: Conference presented by the National Institute of Mental Health and the Office of Medical Applications of Research of the National Institutes of Health (NIH) on "Mood Disorders: Pharmacologic Prevention of Recurrances". Masur Auditorium, The Warren Grant Magnuson Clinical Centre, NIH, Bethesda, Maryland. Contact: Ms. Michelle Dillon, Prospect Associates, 2115 East Jefferson S Suite 401, Rockville, Maryland, 20852.

April 28-29: The American Associati of Dental Consultants fifth annual spri workshop, Windsor, Ontario, Hilton Int national. Contact: Dr. Ed Mazak, c/o Gre Sheild, 285 Giles Blvd, E., Box 160 Windsor, Ont., N9A 6W1. 519-255-113

MAY/MAI

le 5-7 mai: La Société Française de Pa dontologie will hold VIIIe Journées Franç Internationales de Parodontologie. Arl France. Renseignement: Société Française Parodontologie, 57 rue Amsterdam 750 Paris, France.

May 6-9: College of Dental Surgeons B.C. annual meeting, Victoria, B.C. Co tact: Myron Faryna, Convention Chairma 1704-1200 Alberni St., Vancouver, B. V6E 1A6, 604-681-5226.

May 13-16: Ontario Dental Associati 117th Annual spring meeting. T Sheraton Centre, Toronto, Ontario. Conta Mrs. A. M. Durham, 234 St. George S Toronto, Ont., M5R 2P1, 416-922-390

May 18-20: Port Arthur Collegia 75th Anniversary reunion, Thunder Ba Ontario. Contact: Registration Committ FACI, 401 Red River Rd., Thunder Ba Ont., P7B 1B4.

JUNE/JUIN

June 3-5: Alberta Dental Associati Convention, Banff Alberta, Banff Sprin Hotel. Contact: Drs. Wood or Zaharichu 3616 54th Ave., S.W., Calgary, Alt T3E 5H4.

June 4-7: International Association Oral Pathologists general meetin Noordwijkerhout, The Netherlands. Conta Congress Secretariat, 2nd meeting of t International Association of Oral Path ogists, c/o Mrs. R. Mooijen, AZVU, Path ogisch Instituut, De Boelelaan, 1117, N Amsterdam, The Netherlands.

June 8: Dental Horizons Inc are prese ing a seminar entitled "Effective Pra tice Management Techniques: The Id Practice", Einstein, New York. Conta

r. L. Zucker, 3201 Grand Concourse, The ronx, New York, 10468, 212-933-5510.

une 10-16: XIII Biennial Conference on ental Research and Education, Univerity of Manitoba, Winnipeg, Manitoba. Conact: The Faculty of Dentistry, University of anitoba, 780 Bannatyne Ave., Winnipeg, an.

ne 10-16: The Association of Canaian Faculties of Dentistry is holding its nnual meeting, Gull Harbour, Becla land, Manitoba. Contact: Dr. Lindsay ibson, University of Manitoba, Faculty of entistry, 780 Bannatyne Ave., Winnipeg, an., R3E 0W3.

une 14-17: 104th Annual Meeting of he British Dental Association in associaon with the 3rd International Quintessence ymposium and the 2nd International ymposium on ceramics, Barbican Centre, ondon, England. Contact: The British ental Association, 64 Wimpole St., ondon, England, W1M 8AL.

ne 19-22: The 6th International onference on Periodontal Research, ibbutz Shefaim, Israel. Contact: The Sixth nternational Conference on Periodontal esearch, P.O. Box 394, Tel Aviv, 61003, rael.

ne 21-24: The International Congress f Oral Implantologists World Congress II for Oral Implantology, Munich, West ermany. Munich Sheraton Hotel. Contact: lifford J. Kirschner, Executive Director, The nternational Congress of Oral Implantolgists, P.O. Box 2277, Grand Central tation, New York, New York, 10163, 01-783-6300.

ne 23-25: Florida Dental Association 984 Florida Dental Congress. Buena ista Palace, Lake Buena Vista, Orlando, lorida. Contact: Florida Dental Association, 021 Swann Ave., Tampa Florida, 33609. 13-877-7597.

ULY/JUILLET

uly 1-6: Ninth Annual Congress of Dieetics, Toronto, Ontario. Hilton Harbour astle Hotel. Continuing education credits vill be assessed for both ADA and CDA egistered dieticians. Contact: Congress anada, Suite 603, 250 University Avenue, oronto, Ont., 416-591-1498.

AUGUST/AOÛT

ugust 12-17: The New Zealand Dental ssociation is holding its biennial conerence, Auckland, New Zealand. Contact: Dr. N. P. Ewart, Conference Secretary, P.O. Box 28085, Auckland 5, New Zealand.

August 18-24: Canadian Society of Forensic Science 31st annual conference. Viscount Gort Flag Inn, Winnipeg, Manitoba. Contact: Executive Secretary, 613-235-7112 or write: Canadian Society of Forensic Science, 171 Nepean St., Suite 303, Ottawa, Ontario, K2P 0B4.

August 23-25: New Orleans Dental Association annual dental conference. Contact: Dr. Anthony J. Miranda, General Chairman, 3332 Woodlawn Ave., Metairie, LA., USA 70002. 504-888-5681.

August 25-31: 72nd Annual World Dental Congress of the FDI, Helsinki, Finland. Contact: FDI '84, Helsinki 8, SF 00100, Helsinki, 10, Finland.

SEPTEMBER/SEPTEMBRE

September 9-15: McKay Sub-Branch of the Australian Dental Association will be hosting the North Queensland Dental Convention on Hayman Island. Contact: The Secretary, North Queensland Dental Convention, P.O. Box 838, MacKay, 4740, Australia.

September 14-16: The Canadian Academy of Endodontics twentieth annual meeting. Chateau Lake Louise, Lake Louise, Alberta. Contact: Dr. Carl Hawrish, 762-10830 Jasper Ave., Edmonton, Alta., T5J 2B3, 403-425-8930.

OCTOBER/OCTOBRE

October 1-3: American Equilibration Society Satellite Program, Hyatt Regency Hotel, Acapulco, Mexico. Contact: The American Equilibration Society, 8726 North Ferris Ave., Morton Grove, Illinois, 60053, 312-965-2888.

October 4-5: Eighth International Congress of Dental Technicians, Cologne, Germany. Contact: Messe-und Ausstellungs Ges. m.b.h., Koln, Messeplatz, Postfach 210760. D-5000, Koln, 21, Deutz.

October 18-20: The American Association of Public Health Dentistry 47th annual meeting, Atlanta, Georgia. Abstracts must be submitted by May 1, 1984 to: Dr. Myron Allukian, Program Chairman, 818 Harrison Ave., Boston, Mass. USA, 02118.

October 28: Dental Horizons Inc. is presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice", Bronx New York. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, New York, 10468, 212-933-5510.

NOVEMBER/NOVEMBRE

November 5-10: 11th Asian Pacific Dental Congress, Excelsior Hotel, Hong Kong. Contact: Congress Secretariat, International Conference Consultants, 57 Wyndham St., First Floor, Central, Hong Kong.

November 14-16: Scandinavia's largest international trade fair "Swedental '84" will be held in Stockholm, Sweden. Contact: Strusberg/Hewitt/Radley, U.S. representatives, 6671 Sunset Blvd., Suite 1525, Los Angeles, California, 90028, 213-462-6260.

DECEMBER/DÉCEMBRE

December 1984: The Indian Dental Association's 39th annual conference, Bombay India. Contact: Dr. L. K. Ghandi, Conference Secretary, 39th IDA Conference, C-56, N.D.S.E., Part II, New Delhi, 10049.

1985+

January 1985: Second International Conference "Clinical Factors and Mechanisms Influencing Bone Growth", University of California, Los Angeles, Calif. Abstracts submitted no later than June 30, 1984. Contact: Andrew Dixon or Bernard Sarnat, Dental Research Institute, School of Dentistry, School of Medicine, Centre for Health Sciences, University of California, Los Angeles (UCLA), Los Angeles, California, 90024.

May 12-17, 1985: The 24th Australian Dental Congress will be held in Brisbane, Australia. The Congress is hosted by the Australian Dental Association. Contact: The Congress Secretariat, P.O. Box 29, Parkville, Vic., Australia 3052.

September 27-28, 1985: Canadian Academy of Restorative Dentistry annual meeting, Ottawa, Ontario. Contact: Dr. Ed. J. Abrahams, # 322-267 O'Connor St., Ottawa, Ontario, K2P 1V3, 613-236-1671.

September 27-30, 1985: The Royal College of Dentists of Canada annual meeting, with convocation and dinner and symposium, Ottawa, Ontario. Contact: Kay Montgomery, Executive Secretary, Royal College of Dentists of Canada, 170 St. George St., Suite 614, Toronto, Ontario, M5R 2M8, 416-964-7263.

September 29–October 2, 1985: The Canadian Dental Association 1985 national convention. Ottawa, Ontario.

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John O. Butler Co. 125
CDSPI ..... 120 & 168
Cooper Laboratories Inc. ..... IBC
Dupont Pharmaceuticals 156
East West Travel and Tour Corp. 138
Healthco Canada 144
International Society for Medical and Dental Research 147
Ivoclar Vivedent 136
Kerr Canada 132
Kingston Business Systems 173
New Zealand Dental Assoc. 178
Nobilium 180
L. D. Pankey Corp. 172
Pfingst 172
Premier Dental 138
Procter and Gamble Inc. ..... IFC
Quintessence Publishing 148
Rathman and St. John Orthodontic Labs. 127
Henry Schein Inc. 143
South Australia University of Adelaide 147
Warner Lambert ..... OBC
Williams Gold 128
Wright Dental 137

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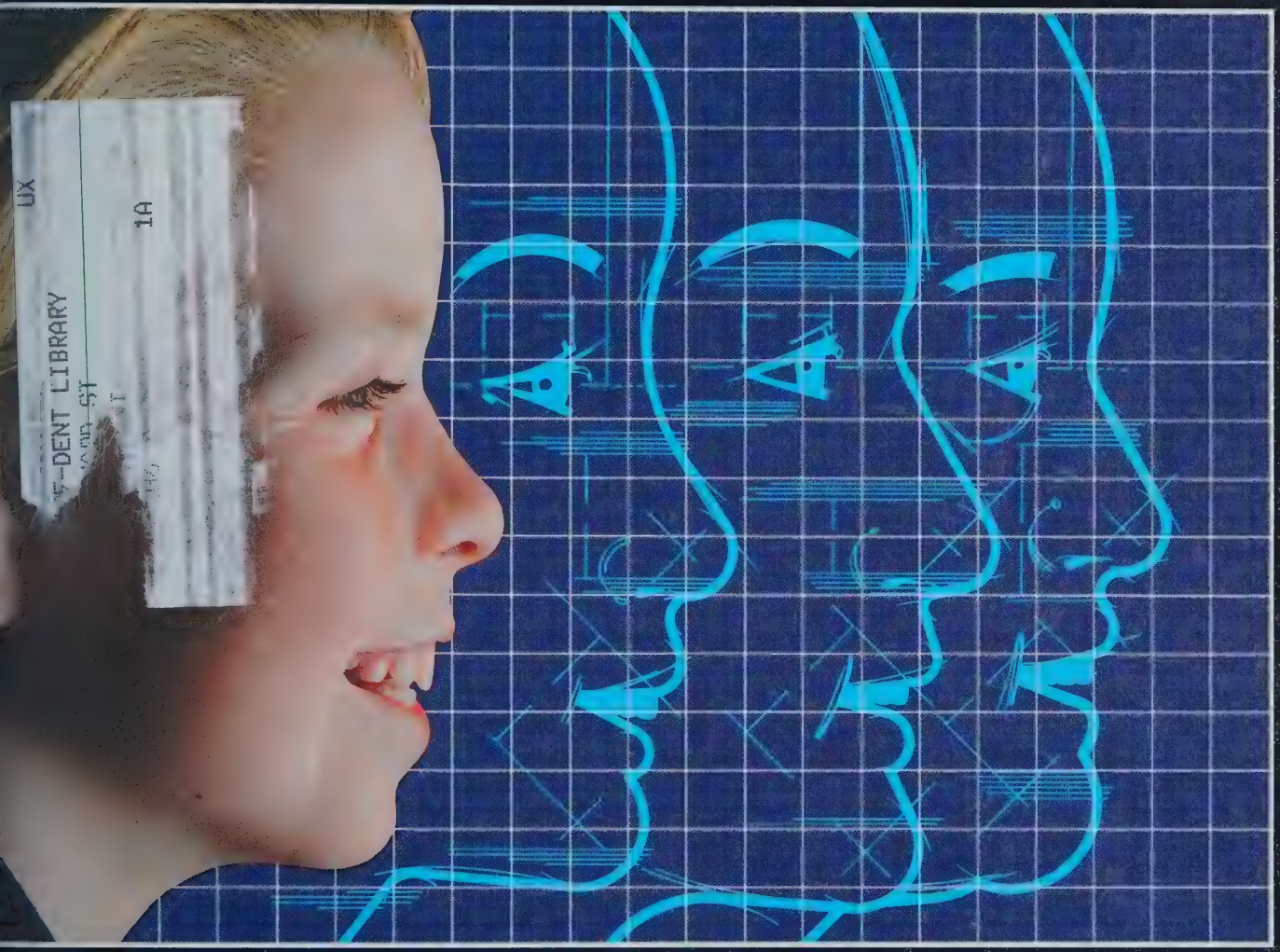

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Crest helps reverse the caries process... even after it's started.

Until recently, it was widely accepted that the caries process was irreversible and that fluoride worked mainly by reducing the solubility of surface enamel. But, in the past few years, researchers have brought a new understanding of caries formation and the ways in which fluorides work.

Experts have come to view the decay process as an imbalance in the natural dynamics of demineralization and remineralization going on in the tooth. An area of subsurface decalcification, or white spot, first signals that demineralization is outpacing remineralization, and that the decay process is underway.[1,2] Research has shown that when free fluoride ions are introduced to the white spot area, remineralization can be accelerated–and the decay process actually reversed.[1,2,3]

Now, research has demonstrated that Crest's Fluoristat–which delivers the highest level of free fluoride in Crest's history[4]–penetrates tooth enamel and concentrates its fluoride in the decalcified white spot areas,[5] where it can hasten remineralization.

This begins to explain how Crest can help reverse the critical early stages of the caries process... even after it has started.

CREST
Concentrates its power on the weak spots.

CANADIAN DENTAL ASSOCIATION RECOGNIZED

"Crest contains sodium fluoride which is, in our opinion, an effective decay preventive agent, and is of significant value when used in a conscientiously applied program of oral hygiene and regular professional care."
CANADIAN DENTAL ASSOCIATION

References: 1. Ostrom, C.A. et al., J Dent Res, 56(3):212-221, 1977. 2. Arends, J., ten Cate, J.M., J Cryst Gro, 53:135-147, 1981. 3. Silverstone, L.M., Caries Res, 11 (Suppl. 1):59-84, 1977. 4. Data on file at Procter & Gamble, Inc. 5. Mobley, M.J., J Dent Res, 60(12):1943-1948, 1981. For further information, please contact Crest Professional Services, P.O. Box 355, Station A, Toronto, Ontario M5W 1C5

March/mars 1984 Vol. 50 No. 3

JOURNAL

Canadian Dental Association
de l'Association Dentaire Canadienne

EDITORIAL 182

Dentists attending the CDA-ODQ Conjoint Convention in Montréal, April 8-12, are urged to strike a balance in participation and take full advantage of the educational opportunities.

NEWS UPDATE 183

BOTTLED WATER

The popularity of bottled drinking water should not reduce the intake of fluorides nor endanger dental health, according to prominent authorities.

MRC RESEARCH FUNDS

Two University of Toronto dental teams will receive nearly $6 million for research projects.

'THREE-MINUTE WORKOUT'

That is the theme of the National Dental Health Month campaign in April.

BRIEFLY 191

Dental news items from across Canada and around the world.

LETTERS 195

A reader takes exception to the suggestion in a JCDA article that acupuncture is a lengthy and sometimes ineffectual procedure in dental treatment.

CDA RESOURCE CENTRE 197

A list of articles from the CDA Resource Centre/Library on the subject of Hepatitis B.

BOOK REVIEWS 201

Clinical Use of Drugs in Patients with Kidney and Liver Disease.
The Begg Appliance and Technique
An Atlas of the Surgical Management of Periodontal Disease.

ARTICLE 207

SPECIALTY FEATURE – PERIODONTICS: STATUS REPORT.

A specialist in this field provides an update on recent and current developments in periodontics.

SCIENTIFIC

SYMPOSIUM 25 213

Three presentations on the subject of caries:

WILL THE DIETS OF THE FUTURE BE LESS CARIOGENIC? 213

CAN MICROBIOLOGICAL KNOWLEDGE BE APPLIED IN DENTAL PRACTICE FOR TREATMENT AND PREVENTION OF DENTAL CARIES? 221

FUTURE IMPACT OF PUBLIC HEALTH AND PREVENTIVE METHODS OF THE INCIDENCE OF DENTAL CARIES. 229

MERCURY LEAKAGE DURING AMALGAM TRITURATION 234

HISTOLOGICAL EVALUATION OF DURAPATITE 239

THE HEMI-MONOBLOC 245

RRSP 192

OBITUARIES 195

MARKETPLACE 251

ANNOUNCEMENTS 254

ADVERTISERS' INDEX 255

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CONVENTIONS
A BALANCED VIEW

The value of a dental convention as a learning experience cannot be underestimated.

Learning should be the primary purpose for attendance.

Of course there are opportunities to renew friendships at social functions and convivial gatherings in hotel rooms. But good conventions offer a balance of social activities, association business and scientific and clinical sessions.

Much time, effort and expense have been invested by the ODQ and CDA and specialty groups to assure a high calibre scientific program and good practical clinical sessions during the upcoming CDA-ODQ Conjoint Convention in Montréal, April 8-12.

These organizations have accepted their responsibilities to ensure that member dentists are kept up to date in the areas of new procedures, materials, equipment and concepts, and have furnished the means to do so.

In this era of sometimes bewildering change, the dentist cannot cope in isolation with matters such as modernizing his facilities, deciding on computerization of his practice, becoming familiar with newly-identified practice hazards, evolving better business management and investment programs, considering the merits, or otherwise, of retail dentistry, or deciding how to stem the declining patient load trend.

No professional's education can end the moment he or she receives a university degree, and those in the field of public health are particularly aware of this.

There has been an explosion of new knowledge in recent years, and problems that were unknown a few short years ago are now demanding fast and effective answers.

Dr. Michel Jahjah and his Conjoint Convention planning committee members have gathered a group of eminent speakers and discussion group leaders to investigate such subject matter as Cardiopulmonary Resuscitation, Computers in Dentistry, Time Management, Pharmacology, New Concepts in Paedodontics, Composite Resins and Predictable Restorative Procedures.

Exhibitors will be displaying and answering queries on the latest developments in dental instrumentation, materials, publications and the application of equipment in dental practice.

The dentists visiting the Convention will still be able to meet old friends, to enjoy some camaraderie and release from everyday pressures, but he or she has an unparalleled opportunity and responsibility to take advantage of a range of scientific, clinical and exhibit area presentations.

There could well be a link between missing educational opportunities and the worrisome "empty chair" syndrome that plagues some practices these days.

Dentists who are forward-looking and aggressive enough to upgrade their professional status and knowledge, keeping in step with all the latest developments, will, without question, provide service of the highest quality to their patients.

It should be noted that the general public is much more knowledgeable these days about new developments in many public health fields—including dentistry, and the quality of dental care. They are much more inclined to pass by the dentist whose procedures and equipment are not up-to-date and seek out those dentists who are.

Those who are concerned about their own dental welfare and that of their family members are likely to advise friends and neighbors about practitioners in the local dental fraternity who are up-to-date and about those who are not.

Word-of-mouth communication is still the best form of practice-building activity there is. Bridge party testimonials about a high level of satisfaction are very effective recommendations for any professional.

Conventions provide one of the most convenient vehicles for continuing education. Most sessions are conducted only a few steps away from your hotel room. Not to attend or miss most of the scientific or clinical sessions is to miss the best opportunity there is to meet your professional responsibility.

Today, the same concern for continuing education is recognized by the whole dental team.

Hygienists and assistants should be encouraged to upgrade their knowledge at the scientific and clinical sessions provided at their concurrent conventions.

Fully qualified, up-to-the-minute dental teams provide the patient with an encouraging and impressive overall picture of efficiency and professionalism — the stuff that the patient's recommendation to friends and relatives is made of.

Clarence Metcalfe
Editor JCDA

BOTTLED WATER UPSWING WILL NOT AFFECT DENTAL HEALTH

More and more Canadian consumers are purchasing something they can get readily in their own homes—water, but without the recommended amount of fluoride.

Bottled spring water sales appear to be on the upswing, but according to a leading Canadian dental researcher, the increase in bottled water consumption should have no effect on dental health in either fluoridated or non-fluoridated communities for adult Canadians.

According to Wayne Smart, owner of Crystal Springs, a company selling bottled water in the Toronto area, sales for his company went up 30 per cent last year. He attributes the jump in sales in part to concern about fluoridation.

"Some Toronto area residents had concerns about the safety of fluoridation and did not like the taste of fluoridated water. That's how the company got started in 1963—selling water from an underground spring in the Caledon Hills area of Ontario," said Mr. Smart.

"Fluoride is not added to Crystal Springs water. Whatever mineral elements are present in the spring come out in the water but there are no chemicals or additives put in, including fluoride," he said.

Another popular brand of spring water being sold in Ontario and Quebec is Labrador Spring. there is .44 ppm of fluoride in this brand, which is well below the 1 to 1.2 ppm recommended by the dental profession and CDA.

Hamilton Pragasam, Director of Quality Control for Labrador Spring head office in Montreal, told the Journal that the main reason bottled water is so popular with customers, is because there are no chemical additives of any kind in the water.

"There are only naturally occurring minerals including fluoride in Labrador Spring water," he said, "But there is no chlorine or chlorine taste in our product."

Most of the people who use Labrador Spring use it in making drink mixes, baby food, coffee or tea. Many of our customers prefer water with no chlorine taste for these purposes," Mr. Pragasam said.

As the spring water market grows, the mineral market remains steady. Many mineral waters contain an amount of fluoride far above the recommended amount. Vichy-Celestine, for example, contains 5.8 ppm of fluoride.

Whether or not Canadians consume only bottled water, however, will have little or no effect on the adult population's dental health.

No effect on dental health

Dr. John Stamm of McGill University in Montreal, an international authority in the field of caries research, told the Journal that the exclusive consumption of bottled water would have no effect on Canadian teeth.

"Bottled water would have to be consumed exclusively, meaning that no other sources of fluoridated water would be consumed, to have even a small effect. This, however, is impossible," said Dr. Stamm. "No one can possibly consume a fluoride free diet. All water supplies have some amount of fluoride in them. Any processed foods usually contain fluoride and tea leaves are very high in fluoride." he said.

"Fluoride is, after all, the 14th most common element in the earth's crust," said Dr. Stamm.

Dr. Robert W. Dabeka, a research scientist with Health and Welfare Canada, whose field of expertise is toxic elements in foods, concurs with Dr. Stamm.

"There would be no problems in adults wishing to consume only bottled water. Fluoride is contained in many other sources. Tea leaves, for example, contain four or five times the recommended amount of fluoride anyway. So anyone making a cup of tea during the day would definitely get an adequate amount of fluoride, even if he or she preferred to drink bottled water," said Dr. Dabeka.

While bottled water has caught on in Ontario and Quebec, according to Mr. Pragasam at Labrador Spring, there appears to be little market for it outside of those two provinces. According to Dr. Stamm, Canadians drinking bottled water, for whatever reason and wherever they live, are not suffering from a lack of fluoride.

SCHOOL-BASED FLUORIDATION PROGRAMS IN U.S. MAY NOT BE COST-EFFECTIVE

The results of a four-year study involving nearly 30,000 American school children indicate that fluoridation of community water systems remains a primary defence against dental disease. The limited effectiveness and high cost of school-based fluoride mouth rinse and tablet programs, however, suggest that the results may not warrant the investment involved.

These are two of the key findings of a study commissioned by the American Fund for Dental Health and supported by a nearly $7 million grant from the Robert Wood Johnson Foundation.

The study had as its goal the assessment of whether caries in children could be slowed or eliminated by offering a school-based program combining preventive techniques. These included application of sealants to the most susceptible tooth surfaces, regular use of fluoride mouth rinse and tablets, and classroom dental education.

Some significant findings

- The study found that dental decay rates among U.S. children have dropped sharply in recent decades and suggests that this is largely attributable to exposure to fluorides in that nation's water and food supplies and to the use of fluoride toothpaste.
- A substantial proportion of children had no cavities. Only 20 per cent of the children accounted for nearly 60 per cent of all decay found.
- The costs of delivering simple as well as comprehensive regimens of dental care were far higher than had previously been estimated, ranging as high as nearly $55 per child per year.
- The presumption that schools are highly efficient sites for delivery of dental services was not borne out; in fact, scheduling and other logistical difficulties were considerable.
- Sealants were the single most effective (and expensive) preventive measure offered in the program, accounting for reductions in decay as much as 65 per cent.

The National Preventive Dentistry Demonstration Program tracked children aged five to 14 in widely separated communities across the United States. Five of the communities do not have fluoridated water systems.

The finding was that most caries occur in a relatively small proportion of children and suggests that a strategy of targeting preventive services, as opposed to broad-scale programs, be studied. At the moment, the American Fund for Dental Health is conducting extensive secondary analyses of the data base developed during the National

Preventive Dentistry Demonstration Program (NPDDP) to address that specific issue. The present study is also supported by The Robert Wood Johnson Foundation, with a grant of $375,000. The study is being carried out by the Fund's program director, Dr. Harry Bohannan at the University of North Carolina. Dr. Bohannan was the Project Director of the NPDDP.

The American Fund for Dental Health is the only voluntary non-profit health agency in the United States raising funds and making grants for the support of dental research and education.

TWO DENTAL RESEARCH GROUPS WILL RECEIVE $6 MILLION IN FUNDING

Two research groups will receive more than $6 million in funding during the next five years as a result of an agreement signed recently between the Medical Research Council of Canada and the University of Toronto's Faculty of Dentistry.

The groups will study periodontal physiology and the requirements for a successful dental implant.

The research into periodontal physiology will be carried out by an MRC group founded by Dr. A.H. Melcher. Since this study group was first established in 1973, the impact of their research has greatly affected oral biologists and clinicians, by contributing fundamental new knowledge to the general discipline of connective tissue biology.

During the past five years, the group has been responsible for 78 research papers and 14 textbooks or chapters, and it has been joined by 10 visiting scientists in that time. Also, seven post-doctoral fellows and 18 graduate students received their PhD degrees in the past five years, six of whom previously held dental degrees.

This group now consists of Drs. J. Sodek, J.N.M. Heersche, J.M. Ferrier and J.E. Aubin. Between the 1983-84 term and 1988-89, it will receive more than $5 million from the MRC in support of their research.

(Another aspect of this University of Toronto research being funded by MRC, previously announced in the CDA Journal, July, 1983, is the work to be carried out by Drs. R.M. Pilliar, D.A. Deporter, A.H. Melcher, D.C. Smith, P.A. Watson and J.C. Van Loon, between 1983 and 1987 with the objective of introducing new concepts of dental implant design. They also aim to develop a simpler and less expensive system for the implantation of teeth than already exists.

The MRC grant for this research project will total about $1.25 million.)

Multidisciplinary group

The Medical Research Council Group in Periodontal Physiology is a multidisciplinary research team. It has combined expertise in cell biology, biophysics, endocrinology and biochemistry to analyze the structure of the hard and soft connective tissues of the periodontium and to study the activity of the cells that form and maintain these tissues. The group believes that if it can be learned how the cells of the supportive tissues are controlled, then it should be possible to manipulate these cells to advantage in clinical treatments.

Dr. Jaro Sodek will highlight several aspects of the group's investigations. He will outline the group's unique discovery of heterogeneity in population of periodontal cells and the development of a novel culture system in which bone formation occurs in a completely defined medium. He will also briefly describe the recent findings that hormonal regulation of cells involves electrical effects at the cell surface, and will summarize progress made toward the development of a diagnostic aid for active periodontal disease.

The group feels that the answer to the question of how to instruct bone cells to increase in number and become more active in forming bone, is desperately needed to help dentists treat patients who have lost bone as a consequence of periodontal disease.

Similarly, they feel this would allow physicians to treat patients with bone loss as a result of injury, operations, or simply as a result of aging.

The researchers are attempting to learn how the cells in the supporting tissues of the tooth, one of which is bone, can be made to "listen to our instruction" and respond to them as the group wishes them to do.

A unique way to find the answer, they believe, is to place the cells of the bone, or even whole embryonic bones, in a completely defined environment and then experiment under these conditions. In other words, they wish to study bone metabolism and bone cell activity in the laboratory in tissue cultures.

The group believes it has developed culture systems in which, for the first time, new bone is formed by cells in a completely defined environment. At the moment, they have discovered that the bone forming cells, called osteoblasts, can be made to double their response to bone regulating hormones. They are also discovering in which hormonal environment the cells live longest and increase their numbers.

The ultimate goal of these laboratory experiments is to improve treatment of the patient, which will imply testing the effect of specific substances or messages not only under laboratory conditions, but also in patients. For example, the effects of fluoride or bone metabolism are currently evaluated in both the laboratory and in clinical studies on osteoporosis.

It is anticipated that similar studies involving treatment of bone loss in periodontal areas, will follow.

APRIL IS NATIONAL DENTAL HEALTH MONTH

"Three minute workout" is NDHM theme

Devotion to the principle of fitness is sweeping the country.

Participation in home fitness routines and membership in fitness clubs has been growing by leaps and bounds.

The National Dental Health Month campaign committee believes that good dental health should be a major consideration in the overall physical fitness picture.

In tune with this concept, they adopted the theme: "Three Minute Workout" for the 1984 National Dental Health Month campaign in April.

Because of the success of fitness campaigns conducted by such organizations as PARTICIPaction, the NDHM committee believed this approach might arouse a higher level of dental health awareness in the Canadian public.

Thousands of Canadians have been fully convinced of the need to jog, to climb stairs instead of taking elevators, to follow a proper diet and work out on a regular schedule. However, the committee pointed out, these fitness devotees tend to forget that fitness also means taking care of the teeth.

APRIL IS NATIONAL DENTAL HEALTH MONTH

Promotional material such as the artwork newspaper drop-ins shown above, are being distributed for use across Canada during April.

PROMOTE NATIONAL DENTAL HEALTH MONTH

Limited quantities of promotional materials prepared for National Dental Health Month are still available as listed on the order form below. Orders will be filled on a first-come, first-served basis.

		QUANTITY	PER UNIT COST*	TOTAL
TELEVISION				
30-second ¾ Videotape	– Eng.	_____	$25.00	_____
	– Fr.	_____	$25.00	_____
Other	– Eng.	_____	TO BE	_____
	– Fr.	_____	DETERMINED	_____
35mm colour Slide	– Eng.	_____	$ 1.50	_____
	– Fr.	_____	$ 1.50	_____
RADIO				
30-second	– Eng.	_____	$ 8.00	_____
	– Fr.	_____	$ 8.00	_____
PRINT				
Magazine/Newspaper Advertisements				
Set of 1-, ½-, ¼ page and Teaser Ads	– Eng.	_____	$ 1.00	_____
	– Fr.	_____	$ 1.00	_____
Posters				
12 × 18 two-colour	– Eng.	_____	50¢	_____
	– Fr.	_____	50¢	_____
Decals (Must be purchased in lots of 100)				
	– Eng.	_____	$10/100	_____
	– Fr.	_____	$10/100	_____
NOVELTY				
Buttons (Must be purchased in lots of 100)				
3'' round two-colour	– Eng.	_____	$25.00/100	_____
	– Fr.	_____	$25.00/100	_____

CHEQUE ENCLOSED $ _____

SHIP TO:

NAME: _____

ADDRESS: _____

_____ POSTAL CODE: _____

TELEPHONE: _____

Please make all cheques payable to the Canadian Dental Association.

***A limited number of Press Kits are available free-of-charge.*
** Prices will fluctuate slightly depending on final quantities ordered.*

Theme on decals, posters and ads

The ''3 Minute Workout'' theme is prominent on this year's NDHM buttons, posters, decals and in newspaper and TV advertisements.

The core of the message the committee hopes the NDHM campaign will get across to the public is best stated in an excerpt from a suggested newspaper advertisement contained in the 1984 NDHM kit:

> ''It's never too late to make dental care an essential part of your total fitness program. The care you put into cleaning your teeth now will go a long way to helping you keep them when you're older.
>
> ''So start your day the right way—with the three-minute dental workout. Keep your teeth and gums healthy by daily brushing, flossing and rinsing. Eat nutritiously balanced meals, avoid snacks and visit your dentist regularly. You'll not only feel better for it; you'll look better too.
>
> ''Make the three-minute dental workout part of your daily fitness regimen today. It's as easy as one, two three.''

Material in kits

In addition to newspaper and radio promotional materials, the 1984 NDHM kits include ''Facts for Spokespersons,'' ''Suggestions for Speakers,'' ''Dental Health Activities for Schools,'' a copy of ''Canada's Food Guide'' and ''Certificate of Appreciation'' forms.

Suggestions for Speakers material includes advice on preparation for a speech, the method of delivery, the use of props and tools and the source of research aids on dental and related subjects.

School Activities material advises about the types of experiments and activities that can be carried on for different age groups, based on school grades. These are prepared in lesson form.

Suggested newspaper articles range from short pithy items on the NDHM theme to full-length features to enlighten the general public about advances in dental treatment and specialty areas. These include explanations that dentures are now more comfortable and functional, significance of efforts in prevention and dental research, how to avoid sports injuries to the teeth, fluoridation, TMJ disorders, the susceptibility of the teeth of babies and advances in the field of orthodontics.

A limited supply of ''Certificate of Appreciation'' forms are available from CDA for presentation to groups or individuals in the community who give outstanding support to the NDHM campaign. These can be presented by the local dental societies, but sparingly. These, the committee advised, should only be awarded in recognition of

outstanding service—to help preserve the integrity of the award.

The Canadian Fund for Dental Education helped to defray some of the cost of the NDHM kits.

Good results in 1983

The NDHM committee was encouraged by the level of participation in communities across Canada and the use of materials by the media, during the 1983 campaign. It is their hope this level can be achieved, and surpassed, this year.

NEW DENTAL, MEDICAL RESEARCH GROUP HOLDS FIRST SEMINAR

The International Society for Medical and Dental Research (ISMDR), a one-year old organization, held its first seminar in Freeport, Grand Bahama, recently.

The conference featured as topics of discussion, cancer research, surgical dentistry, dental prosthetics, periodontology and implantology.

A second seminar covering similar topics is scheduled for May 7-11.

The seminar included members and other physicians and dentists from the United States, Canada, Great Britain, Germany, Switzerland and the Bahamas.

Founded by Dr. Jana Dressler, a practising dentist and President of ISMDR, from West Germany, the Society promotes medical and dental investigation and post graduate training on an international basis. By providing a forum on current research developments in both fields, ISMDR offers professionals a unique opportunity to do cross-field studies.

"Our members are experts in their respective fields and specialties. A featured speaker at the seminar this year was Dr. Lawrence Burton, Director of Research for the Immunology Researching Centre in Grand Bahama. The lecture focussed on his controversial but effective Immuno-Augmentative Therapy. The therapy has had impressive results in terminally prognosed cancer patients and substances used have been biologically tested and patented in the United States," Dr. Dressler said.

It was pointed out that for those interested in membership or attendance at the May seminar, ISMDR offers many features. Along with sponsorship of professional exchanges in American, Canadian and European communities, the Society offers practice establishments and legal and tax-related advice. Eligible members are also provided with professional insurance advice.

Information about ISMDR or the May seminar will be provided by: Rolf Bareuter, International Society for Medical and Dental Research, Bockenheimer Anlage 1A D-6000, Frankfurt/Main 1, West Germany 0611-550254.

Attending the recent ISMDR seminar in Freeport, Grand Bahama, were, left to right: Dr. Jana Dressler, founder and President, guest lecturer Dr. John U. Clement of the Antoni Researching Centre in Freeport and Mrs. Clement.

FDI 84—IN HELSINKI

Capital of Finland is a city of 500,000

Helsinki, which will play host to the FD World Dental Congress, August 25-31, i built on a peninsula jutting into the Gulf c Finland, and on surrounding islands.

Founded in 1550, the city now has population of about 500,000. It became th capital of Finland in 1812.

The neo-classical centre of the city wa built in the period from 1820 to 184C around the Senate Square. Most of the buil ings in this quarter were designed by th architect C.L. Engel. The most prominer of these edifices is the white Lutheran Cath dral, built in 1840. Nearby lies the colou ful market square, where even vistin statesmen are often taken, to admire a beau tiful seaside display of flowers, fruit an vegetables.

Notable modern buildings of Helsinl include Alvar Aalto's modern conferenc centre, Finlandia Hall, the site of the FD Congress sessions, and the Temppeliauki Church, hollowed out of bedrock, wher concerts will be given during the Congress Near the Finlandia Hall are Finland's Hous of Parliament and the National Museum

In the suburbs of Helsinki are the beau tifully planned Garden City of Tapiola founded in 1952, and the Polytechnica College at Otaniemi, the campus area c which includes the fascinating architectur of the Dipoli Congress Centre.

Not far from Helsinki is Hvitträsk, whic three famous architects built in 1902 a their home and atelier. The place where Eli Saarinen, Herman Gesellius and Arma Lindgren once lived and worked is now museum and a centre for art exhibitions an meetings.

The world-famed Finnish composer Jea Sibelius obtained his inspiration fror Finland's national poetry and mighty land scapes. Sibelius spent most of his produc tive years at his home Ainola, located short distance from Helsinki, in country c great natural beauty. Excursions to Ainol and Hvitträsk are not only culturally inter esting, but also give visitors to Finland a opportunity to see something of the Finnis countryside.

Continental climate

The climate in Finland is largely the sam as in Sweden, fairly continental, with col winters and warm summers. In the las week of August, the average temperatur is about 17° Centigrade (62°F). The shor nights of Midsummer have lengthened b August, but the day still lasts abou 16 hours. This is the time of the year whe Nature is at her most generous, the seaso

nlandia Hall, built in 1971, lies by the sea in the heart of Helsinki and is used for congresses, concerts and exhibitions. In the background n the left is the House of Parliament; the tower on the right belongs to the National Museum.

f harvest when the flowers of the late ummer are in full bloom.

Not Scandinavian language

Finland differs from the Scandinavian ountries in its language, which belongs to e Fenno-Ugrian group of languages. The econd official language, Swedish, is the other tongue of about five per cent of the opulation. Finland formed part of the kingom of Sweden from 1154 up until 1809, hen it was united with Russia as an autonmous Grand Duchy. A century of close ssociation with Russia brought cultural fluences from the East. French-Russian ulinary arts are still thriving in Finland. Finland declared its independence in 917. Within the last few decades the ountry has created a policy of neutrality, cknowledged in both the East and the Vest.

Tourist and congress country

Today Finland is an up-to-date tourist and ongress country with high-class hotels, rapid communications and a wide range of colorful events and interesting leisure activities.

Industrial design in Finland is of very high quality. The country is famous for its glassware, ceramics, textiles and furniture.

Finland is a large country covering 337,000 square kilometres. A large proportion of this area, 30,000 square kilometres, consists of water, and the terrain is varied, with many types of landscape. The length of the country, north to south, is 1,160 kilometres and at its widest point the country measures 540 kilometres. It has a total population of 4.8 million, which gives it a population density of one person for every 15 square kilometres.

The country has been called "land of a thousand lakes" and this has been largely responsible for the idea of the Finnish landscape held by the rest of the world. There are actually about 62,000 lakes, more perhaps, if all the smallest are counted.

The air traffic network in Finland extends beyond the polar circle and offers reasonably priced package tours. The railways, with modern sleeping and restaurant cars, issue inexpensive holiday tickets. The Finnish bus network is very well developed, and the lakes are traversed by romantic old world steamers and modern cruisers. For the motorist, there are modern motorways and tourist routes, stretching throughout the countryside.

ARTIFICIAL TOOTH ENAMEL BEING RESEARCHED

Within a few years teeth may be filled by using artificially cloned tooth-enamel.

At the University of Southern California, researchers are conducting experiments with genetic material inserted in yeast, which is producing the protein molecules for dental enamel.

Dr. Harold Slavkin, a dentist and biochemistry professor at USC said the properties of the new material will be equivalent or better than normal human enamel.

"This new substance will look better, last

longer and be less sensitive to heat and cold,'' he said.

The ''cloning'' methods of producing the substance is similar to that used by scientists who synthesized genes that would ''command'' bacteria to manufacture protein molecules for insulin.

Dr. Malcolm Snead, an oral pathologist who conducted the enamel study under Dr. Slavkin's supervision, said ''We've taken the initial step toward identifying genetic material that would cause yeast cells to manufacture the protein molecules for dental enamel.''

Canadian research

Similar studies are currently being conducted at the University of Toronto, Faculty of Dentistry, with an eye to understanding the way tooth enamel is formed.

''We don't really know how enamel is produced,'' said Dr. Gordon Nikiforuk, a leading Canadian researcher in the field of dental enamel at the University of Toronto. ''By producing enamel in a laboratory we can study, using a cell culture, the factors regulating enamel production.''

''In a human or an animal, it is very difficult to study the formation of tooth enamel, but in a laboratory cell model, the researcher can learn much more about enamel production'' Dr. Nikiforuk told the Journal.

Such research, according to Dr. Slavkin, might eventually lead to unlocking the genetic secrets of enamel and possibly discovering more about what leads to genetic defects in tooth enamel development.

NOTE TO CANADIAN DENTAL HYGIENISTS

It has been noted by the Canadian Dental Hygienists Association that all hygienists in Quebec, including those who are not CDHA members will be receiving the CDHA convention package for the CDHA convention in Montreal in April. However, outside the province of Quebec, only CDHA members will receive the CDHA convention information package.

RESTORATIVE DENTISTRY

Annual meeting in Montréal, April 6,7

The Canadian Academy of Restorative Dentistry will hold its annual meeting in the Bonaventure Westin Hotel in Montréal, April 6-7.

Five speakers will make presentations at the 21st scientific meeting on Friday, April 6. The speakers and their subjects are: Dr. Bruce Bell—''Cast Ceramics''; Dr. Brian Ulman—''The Use of Base Metal Ceramic Alloy in Restorative Dentistry''; Dr. Kenneth Lee—''The Role of Periodontics and Orthodontics for Success in Prosthodontic Therapy''; Dr. Harry Rosen—''Trouble Shooting Long-Term Cases'', and Dr. Norman Crainin—''Endosteal Dental Implants.''

On Saturday, April 7, Drs. Neil and Clive Bonner will lead a session on ''Provisional Restorations in Case Planning,'' and Dr. Clarence Lee Sockwell will discuss ''Resin Bonded Bridges.''

Table clinics will also be presented on Saturday.

Dr. John Blomfield, secretary-treasurer of the Academy of Restorative Dentistry, advised the Journal that a detailed program and registration materials will be forwarded on request. His mailing address is 1650 Cedar Avenue, Montréal, Qué. H3G 1A4.

INTERNATIONAL FRANCOPHONE DENTISTS PARTICIPATE IN FIRST FORUM

About 100 dentists from French-speaking countries of the world are participating in the first annual forum of the Association internationale francophone pour la formation continue en odontologie (French International Association for Continuing Education in Odontology), being held in the Antilles.

The Caribbean forum, running from March 3 to 10, was made possible through arrangements made between the Laval University dental school in Québec, confreres at the Antilles National Office of Continuing Education and the French International Association (of France).

About 40 Québec dentists are attending the sessions and a major part of the scientific program is being conducted by members of the Faculty of Dentistry of Laval University.

In the future, one of every three of the annual forum sessions will be held in Québec.

INTERNATIONAL SUMMER SCHOOL AT LAVAL U.

Francophone dentists from such distant points as Africa, Europe and the Antilles, will be able to attend international summer university courses at Laval University Faculty of Dentistry and then enjoy events in this year's fêtes de Québec 84.

The courses in dental education will be conducted the last week in May and the first week in June.

Ten courses of one or two weeks in length will be given on the subjects of practice teaching and research in Odontology.

The students will participate in sma groups of 10 to 15 people and will be in position to benefit from the ultra-moder facilities of the Laval school of dentistry

More than 100 dentists are expected t participate, and about 40 will be fro Québec.

NEW EDUCATIONAL CENTRE OPENS IN U.S.

A new educational training centre for bo the dental profession and the dental trad opened recently in New York City.

The Weissman Centre for the Advanc ment of Technology in Dentistry is locate on the second floor of Whaledent Inte national's headquarters in New Yor Whaledent is the sponsoring company f the Centre.

The Centre, designed as an on-site educa tional facility, incorporates a 60 seat lectu hall, working dental treatment room laboratory facilities, facilities for the produ tion of audio-visual materials and a technic dental library for both film and writte material.

At the Centre's opening ceremonie Henry Vogelstein, Director of Education f Whaledent International, cited four key pu poses for the new facility. These were: t be available as a clinical teaching facility f the dental profession; to help the trad gather key application and technical info mation which will help serve the dent community; to be used as a forum for th introduction of the company's new produc and systems and to serve as a support f Whaledent's research and developme function.

''Our goal in establishing the Centre never to compete with academic instit tions, but rather to augment what they ha to offer,'' Vogelstein said. ''Keeping in min that our purpose is educational, we hope t provide a means for dental professiona to participate in workshops and seminar which will address the multifaceted field dentistry.''

One of the functions of the Centre will b in creating educational cassettes and videc tapes of laboratory sessions in the Centr which will be made available to dent professionals all over the world.

The opening of the Centre was attende by such notables in the profession a Dr. John L. Bomba, Treasurer of th American Dental Association, Dr. Pa Goldhaber, Dean of the Harvard Dent School, Dr. Alvin Fillastre, a noted clinician and Dr. Gerard Courtade, author an lecturer in restorative dentistry.

The Centre's first open two-day seminar on endodontics, took place in January.

REGISTRATION GUIDE

Registration Form

1. Please fill in and return one form per person – only the name of the spouse should appear on the delegate form. One cheque may accompany more than one form.

   Some social events are not included in the basic fee and must be counted as extra. Please read carefully the information given on the form.
2. You will receive an acknowledgement of receipt which will confirm all the details pertaining to your registration.
3. Les journées dentaires du Québec will be in two (2) parts:

   (a) Pre-Convention – Queen Elizabeth Hotel: April 8-9
   Pre-Convention Registration gives access to the reserved session(s) of your choice. Note that the Pre-Convention Registration is totally different from the Convention Registration.

   (b) Convention – Palais des Congrès: April 10-12
   – Conferences
   – Commercial exhibition
   – Programs for auxiliaries
   – Audio-visual program
   – Table Clinics
   – Social program (Queen Elizabeth Hotel & Sheraton Centre)
   – Spouse program (Queen Elizabeth Hotel)
4. Registration deadline: Pre-registration must be received by February 28, 1984 after which date they will be returned to sender. On location registration will be $10.00 more per person.
5. All delegates who register before the February 28 deadline will have a chance to win two Air Canada tickets to any place served by the company.

Plane reservation

An agreement has been established with Air Canada in order that delegates have an Air Canada office specially set up for them.

Hotel reservation

Two hotels offer a special rate of $75.00 (single or double)

– Queen Elizabeth Hotel
  *Headquarters for les Journées dentaires du Québec, the Canadian Dental Association and l'Ordre des dentistes du Québec
  *Reserved sessions of April 8-9
  *"April in Montreal" party
  *Spouse program
– Sheraton Centre
  *Headquarters for hygienists and assistants
  *Presidents' Gala

N.B.: All hotel reservation forms must be returned to the Convention headquarters.

LES JOURNÉES DENTAIRES 1984
CDA/ODQ Joint Convention – Montreal
3565, Berri Street, Suite 200, Montreal, Que., H2L 4G3
April 8-12, 1984

ADVANCE REGISTRATION FORM – TO QUALIFY FOR THE AIR CANADA DRAW
SEND IN THIS WITH CHEQUE BEFORE MARCH 15, 1984
REGISTRATION DURING CONVENTION WILL BE INCREASED BY $10.00 EACH

ONE FORM PER PERSON DUPLICATE FORM FOR MULTIPLE REGISTRATIONS

Name _____

Address _____ Postal Code _____

Telephone no. (Bus.) _____ (Residence) _____ Spouse's name, if attending _____

Please check appropriate classification: ☐ Dentist ☐ Hygienist ☐ Assistant ☐ Technician ☐ Spouse

PRE-CONVENTION – LIMITED ATTENDANCE COURSES APRIL 8-9, QUEEN ELIZABETH HOTEL

English Language

April 8 — Dr. Francis Edwards, MARKETING OF YOUR PROFESSIONAL SERVICE ..... Dr. ..... 75.00 _____
(Simultaneous translation available) Ass., Hyg. ..... 35.00 _____

April 9 — Dr. Alvin Fillastre, PREDICTABLE RESTORATIVE PROCEDURES ..... Dr., Tech. ..... 75.00 _____

French Language

April 8 a.m. — Dr. Pierre Duquette, CONFÉRENCE CLINICO-PATHOLOGIQUE* (Repeat 1983 program)
Dr. ..... 40.00 _____

p.m. — Dr. Robert Langlais, CONFÉRENCE CLINICO-PATHOLOGIQUE* ..... Dr. ..... 40.00 _____
*Participation course

April 9 — Dr. Alain Vaillancourt & colleagues.* JOURNÉE D'ÉTUDE EN PROTHÈSE COMPLÈTE
Dr., Tech. ..... 75.00 _____

*— Dr. Claude Lamarche — Dr. Normand Tardif
— Dr. Huan Pham — Dr. Jacques Valiquette — Dr. Aldo Camarda

Registration form continued

CONVENTION — APRIL 10, 11 AND 12 LE PALAIS DES CONGRÈS — CONVENTION CENTER

Please check appropriate box:

☐ DENTIST/member of the Order of Dentists of Quebec
Registration fee included in licence fee . . . . . nil _____
Includes: access to scientific sessions, exhibits, three (3) lunches, social events need separate reservations, see below

☐ DENTIST/licensed outside of Quebec
Includes: access to scientific sessions, exhibits, three (3) lunches, Monday welcoming reception. Tuesday evening soirée (April in Montreal), Presidents Ball need separate reservation, see below

CDA member/ADA member/foreign dentist . . . . . 195.00 _____

CDA Non member . . . . . 225.00 _____

April 11 CPR course limited to 40 persons: Will attend ☐ Yes ☐ No

SOCIAL EVENTS

☐ Tuesday Evening — **APRIL IN MONTREAL** (included in certain registration packages) _____ per person/20.00 _____

☐ Wednesday evening — **PRESIDENTS BALL** (not included in any package) _____ per person/40.00 _____

☐ Spouse _____ per person/50.00 _____
Includes: access to scientific sessions, exhibits, Tuesday evening soirée (April in Montreal), personal colour analysis, shopping tour, city bus tour, wine tasting, champagne breakfast, tour of stock exchange (a limited attendance registration on a first come basis on site at the convention for certain programs)

☐ Hygienist _____ 75.00 _____
Includes: access to scientific sessions, exhibits, CDHA lecture series. Tuesday President's lunch. Tuesday evening soirée (April in Montreal), Wednesday lunch and wine and cheese reception.

☐ Assistant _____ 60.00 _____
Includes: access to scientific sessions, exhibits, CDAA/AADQ/AADM Lectures, Tuesday evening soirée (April in Montreal), Wednesday night Maple Camp Party

Members of CDAA/AADQ/AADM will receive additional social events. Further information available at registration.

☐ Technician/member CPTDQ _____ 65.00 _____
Includes: access to scientific sessions, exhibits. Social events need separate reservation (see above)

☐ Student _____ nil _____
On site registration only/Includes: access to scientific sessions and exhibits For final year student of Dental, Dental Assisting, Hygienist, Dental Technician Schools

TOTAL: _____

PLEASE MAKE CHECK PAYABLE TO:
CDA/ODQ JOINT CONVENTION
3565, Berri Street
Suite 200
Montreal, Quebec
H2L 4G3

CANCELLATION POLICY:
Cancellations **accepted before March 15** for full refund. Any cancellations after that date subject to a 25% administrative charge.

REGISTER PRIOR TO MARCH 15 AND BE ELIGIBLE TO WIN TWO COMPLIMENTARY TICKETS TO ANY OF AIR CANADA'S WORLD DESTINATIONS!

HOTEL RESERVATION FORM

(Please duplicate form if more than one room reservation is required)

NAME _____
(please print)

ADDRESS _____

_____
(including province, state and country) (zip code/postal code)

TELEPHONE NO. (Bus.) _____ (Residence) _____

PLEASE CHECK DESIGNATION ____ Dentist ____ Hygienist ____ Assistant ____ Technician ____ Student ____ Exhibitor

____ Other (please specify) _____

HOTEL CHOICE:

Queen Elizabeth Hotel (Canadian Dental Association/Order of Dentists of Quebec Convention Headquarters)

☐ Single $75.00 ☐ Double/Twin $75.00 ☐ Other, please specify . . . . . .

Sheraton Center (Hygienists & Assistants Headquarters)

☐ Single $75.00 ☐ Double/Twin $75.00 ☐ Other, please specify . . . . . .

Arrival Time and Date _____ Departure Date _____

HOTEL WILL CONFIRM RESERVATION DIRECTLY WITH DELEGATE. ANY SUBSEQUENT CHANGES TO THE RESERVATION SHOULD BE MADE DIRECTLY WITH THE HOTEL.

PLEASE MAIL TO:

CDA/ODQ CONVENTION, 3565, Berri Street, Suite 200, Montreal, Quebec H2L 4G3

Briefly

Two prominent Saskatchewan dentists will be honored by the College of Dental Surgeons of Saskatchewan at the annual convention in May.

Honorary Memberships will be awarded to Dr. G.G. Beesley of Moose Jaw and Dr. W.K. Martin of Regina.

A Community minded Alberta dentist has been immortalized in that province by the naming in his honor of a residence for senior citizens.

Dr. Stuart Fleming of Red Deer, Alberta, was honored with the naming of Fleming Manor, a senior citizens' residence in that city. Dr. Fleming, who received his D.D.S. degree from the University of Alberta in 1951, has practised in Red Deer since graduation.

He has been active in community life for many years, and especially active in the Kiwanis Club of Red Deer.

Dr. William F. Campbell

Dr. David K. Peters, CFDE Chairman, recently announced the appointment of Dr. William F. Campbell, a practising orthodontist in Winnipeg, as a trustee of the Canadian Fund for Dental Education. Dr. Campbell represents the Provinces of Manitoba and Saskatchewan. The new trustee has an illustrious military background and has served as President of the Winnipeg Dental Society, the Canadian Association of Orthodontists and the Midwestern Society of Orthodontists. Dr. Campbell succeeds Dr. Walker Shorthill, also of Winnipeg, who served on the CFDE Board of Trustees for three years.

Apples as 'brushes'

The chief of Oral Surgery at St. Joseph Hospital in Chicago claims that an apple is "a natural toothbrush."

"Every time you take a bite of an apple, it cleans from the top of the tooth down to the gum," says Dr. Elaine Steubner. She advises people to munch more apples, celery and other forms of roughage. All this, is, of course, in addition to normal brushing and flossing, she advised.

While the storm raged in Canada about extra billing and user fees, a poll taken in the United States revealed that many Americans are prepared to go along with increased out-of-pocket expenditures for health care. The poll, undertaken by a large U.S. insurance firm, indicated that 65 per cent of those questioned said it would be "very or somewhat acceptable" to require employees to pay a portion of their own health insurance premiums. Fifty-eight per cent said it would be acceptable to increase deductibles, and 64 per cent indicated they would accept a system that encourages utilization of nurse practitioners and physician assistants. The poll-taker also noted that a majority of the people questioned supports the concept of government price controls for health care services.

The latest weapon in the fight against prescription drug abuse in the U.S. is a program to educate physicians, dental practitioners, pharmacists and patients in the problems associated with the illegal use of prescription drugs.

At a recent conference of the Alcohol and Drug Problems Association of North America, several noted speakers pointed out that the attacks on prescription drug abuse should be aimed at those diverting the drugs and not at the drugs themselves. One way to stop this type of prescription diversion into illegal channels is through education.

The American Medical Association is developing a program of comprehensive education in this area aimed at physicians, pharmacists, nurses, dentists and veterinarians, among others. Part of the education program will be a video cassette text, instructors guide and evaluation form package.

Another area being developed by AMA for education is the "Prescription Abuse Data Synthesis" system (PADS)., which is currently being tested in five states. This system would bring together information on the supply and demand for drugs from government officials and various other state agencies that are involved in the legislation, supply or distribution of prescription drugs. The computerized PADS system would become an inter-state data bank of information on prescription drugs, their supply and demand.

The United Kingdom' Health Minister has announced a 10 per cent cut in dental student intake in that country, and the measure will take effect in October, 1984. This, it was explained is the earliest date at which the decision could be implemented.

The British decision was based on the major recommendations of the report of the Department of Health's Dental Manpower Study Group. The Study Group recommended regular reviews of dental manpower to allow for any necessary readjustments.

The Health Minister noted that any failure to make this cut now could mean that some of the most intelligent young people would be educated for a career which they would be unable to pursue.

Sodium fluoride may not only help prevent cavities, it may also help prevent brittle bones.

According to the Health News Digest, a combination of sodium fluoride (one of the active ingredients in fluoridated toothpastes), calcium and vitamin D has been shown to prevent spinal fractures and increase bone mass in post-menopausal women with osteoporosis.

Osteoporosis is common in elderly women. It is a disease which causes the bones of the body to become thin and brittle, and as a result, readily fracture.

In women treated with the fluoride, calcium and vitamin D combination in the Hospital for Special Surgery in New York, bone mass increased by about 20 per cent per year.

In the December 1983 issue of the Journal, an article appeared on the safety of dental anaesthetics, with particular reference to their use in paediatric dentistry.

It has since been learned by the Journal that the particular drug, Nisetil, which was the subject of a series of programs on the U.S. television program 20-20, has indeed been approved by the U.S. Food and Drug Administration for use in paediatric dentistry. The field of paediatric dentistry or paedodontics is generally considered to involve the treatment of children under 12 years of age.

According to an American Dental Association press release on the subject, although the ADA cautions its members about the judicious use of Nisetil, a dental analgesic and not an anaesthetic, the ADA has invited Hoffman-Laroche, the manufacturer of the drug, to resubmit the drug for reconsideration under the ADA Council on Dental Therapeutics acceptance program. If Hoffman-Laroche can provide sufficient evidence that Nisetil is indeed safe for use in children under 12, then it will be reinstated on the list of products accepted by the ADA.

One Canadian paedodontist, who routinely uses the drug Nisetil, with no complications, pointed out to the Journal that the American Dental Association is not a legislative body, but merely takes an advisory role in the acceptance of products and advises its members accordingly. According to this Canadian practitioner, who did not wish to be identified in this article, Nisetil has been approved for use in paedodontics by the U.S. Food and Drug Administration, and the FDA takes any legal responsibility for it.

The American Dental Association will soon make available complete in-office computer systems for dentists in the United States. These will be made available through ADA's wholly owned (for-profit) subsidiary, the Dental Office Service Corporation.

In addition to the practice accounting, recall and patient records, it is anticipated that the systems will be linked to ADA's data bases in the Chicago headquarters, and users will be able to communicate with each other, around the country.

Plans call for a six-month test period, in which 10 systems will be installed in dental offices in the Chicago area. During this test period, training manuals and installation procedures will be developed.

Sales of the systems and software are being provided through the Corporation at competitive prices, an ADA statement noted, and profits from these sales will be used to offset the possibility of future increases in ADA membership dues.

The next Drummond-Jackson Fund award of £1,000 will be given out in 1985.

The award will be made to the most meritorious essay on any subject related to dental anaesthesia, analgesia or sedation in outpatient or office dentistry. The competition is open to all dental graduates throughout the world, and entries must be received before December 31, 1984.

For information and conditions of entry, contact: The Secretary, Society for the Advancement of Anaesthesia in Dentistry, 53 Wimpole St., London, W1M 7DF, England.

A number of dentally-oriented instructional materials have recently been developed and published by the DAE Project group at the University of Washington. They have already been used with a high degree of success in a variety of accredited professional educational programs in continuing education settings in the United States.

Twenty-five self-contained modules are available on the following subjects: Establish Patient Relationships; Self-Care I and Self-Care II; Coronal Polish; Topical Fluoride, Normal Radiographic Landmarks, Oral Inspection I and II, Margination: Overhang Removal, Root Planing, Take Study Model Impressions, Pour and Separate Models, Trim and Finish Models, Instrument Transfer I, Instrument Transfer: Restorative, Instrument Transfer: Endodontics, Instrument Transfer: Oral Surgery, Instrument Transfer: Periodontics, Maintaining Operating Field, Rubber Dam, Microbiology, Sterilization and Disinfection, Dental Handpieces, Maintain Equipment and Operatory, Maintain Sterilization and Laboratory Equipment, Faculty Guide and Test Items, and three audio visual programs: – Anatomical Structures of the Periodontium and their Healthy Appearance; Assess Periodontal Health, and Oral Landmarks.

All the listed material is available from Teacher College Press, Columbia University, 1234 Amsterdam Ave., New York, N.Y. 10017. Telephone (212) 678-3929.

A noted dental and medical researcher, Dr. Per-Ingvar Branemark, of the University of Goteborg and Institute for Applied Biotechnology, Goteborg, Sweden, recently received a U.S. research award.

Dr. Branemark is the recipient of the Jerome M. and Dorothy Schweitzer Research Award for his development of a successful and predictable bone-anchored fixture method for clinical dentistry.

The process, known as "Tissue Integrated Prosthesis" (TIP), is a major advance in the treatment of edentulous patients. This process enables patients to have their lost natural teeth replaced permanently by bone-anchored prostheses.

After years of research, Dr. Branemark, in conjunction with Bors Nobelpharma of Sweden, developed screw-shaped fixtures of pure titanium which are bio-compatible with bone and soft tissue. Following nearly 15 years of clinical trials, the new material was judged highly successful.

TIP was recently introduced to the North American dental community at a University of Toronto conference, held in 1982. The University currently has a training program for the new technique.

CDA Retirement Savings Plan

Unit values of the Canadian Dental Association's Retirement Savings Plan stood as follows on Jan. 31, 1984.

Common Stock Fund	$76.68535
Fixed Income Fund	$38.38071
Guaranteed Fund	$27.69839
Balanced Fund	$15.53002

Total assets (market value) of the plan were $38,404,075.

The previous month's figures, as of Dec. 31, 1983, stood as follows:

Common Stock Fund	$78.66773
Fixed Income Fund	$37.95691
Guaranteed Fund	$27.50841
Balanced Fund	$15.62012

Total assets (market value) of the plan were $38,594,895.

For further information write to: Canadian Dental Service Plans Inc., Ste. 600, 2 Lansing Square, Willowdale, Ontario M2J 4Z3 or call the central information services of CDSPI at 1-800-268-5418 (toll free number for Western Canada, Atlantic Canada and Ontario for Code 807 only, 1-800-268-3411 (toll free number for Quebec and Ontario except Code 807), and 497-7117 (Metro Toronto area).

FÉDÉRATION DENTAIRE INTERNATIONALE MEMBERSHIP

Membership in the Fédération Dentaire Internationale for 1984 is now open for new or renewed membership. Supporting membership from Canada and attendance at the Tokyo Congress was significant and it is hoped that such support will continue. After the March 1984 issue, only those who renew their membership will continue to receive the Newsletter and in addition, it is necessary to be a supporting member to attend the outstanding Congress planned for Helsinki, Finland on August 25-31, 1984.

Registrants to FDI world congresses must be supporting members of the Federation. To be eligible for supporting membership, Canadian dentists must be members of the Canadian Dental Association.

The subscription fee is $35 (Canadian) or in combination with a subscription to the International Dental Journal $60 (Canadian). We urge you not only to become a member but to encourage your colleagues to join as well.

Your membership fee is your contribution in support of FDI in its efforts to promote improved dental health on a worldwide basis in direct exchange of scientific knowledge and expertise. A portion of the fee will also be used by the CDA to offset administrative expenses associated with the FDI membership program.

Please return the attached form with your remittance without delay to the Canadian Dental Association, 1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6.

CANADIAN DENTAL ASSOCIATION

1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6

MEMBERSHIP APPLICATION FÉDÉRATION DENTAIRE INTERNATIONALE

— To develop contacts with dentists from around the world

— To be part of your profession's voice in the international community

— Fees include administration cost, U.S. premiums, CDA representation to FDI

_____ $35 FDI Supporting Membership will receive the Quarterly FDI Newsletter and Membership Card

_____ $60 FDI Supporting Membership and Subscription to International Dental Journal

NAME _____ ADDRESS _____

THIS IS NOT A LICENCE FEE, this is your remittance for annual supporting membership.

Please return this form with your remittance payable to CDA. A receipt and membership card will be issued.

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Solution for Unsightly Gingival Margins

The Gingival Margin Repair Kit eliminates black and grey gingival margins on porcelain-fused-to-metal crowns. A combination of highly-filled multi-shaded restoratives, excellent opaquer, and patented porcelain bonding system successfully restores these problem areas in one appointment.

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Completed margin repair renews vitality to porcelain accents.

Simplified Procedure:

A special Gingival Correction Diamond is used to carefully remove exposed metal from behind the porcelain and exposes fresh dentin or clean metal surface. Preparation is cleaned with Priming Agent, rinsed with water and dried. To assure dryness, use Dry Bond for an absolutely moisture/contaminate free surface. Next apply Creation™ Bonding Agent for increased bond strengths, especially if bonding to exposed dentin. Apply Bonding Agent with a brush. Gently evaporate. Metal Opaquer is applied. Adjusting the ratio of powder to liquid assures the desired viscosity. When correctly positioned, cure with Visar 2™ or any white-light system. Restorative material is selected then placed over the opaquer and polymerized with the Visar 2™ Light. Flash and excess are trimmed with a thin pointed Brasseler ET™ Bur. The finished restoration is polished with Extra-Smooth™ Polishing Paste.

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805/922-8491

Improving Your Bottom Line Is Our Purpose

Letters

WISDOM TEETH—TO EXTRACT OR NOT TO EXTRACT?

I am convinced that routinely removing third molars in young patients is poor practice. I have seen patients in their teens where the third molars radiographically look like they are mesio-angularly impacted. The majority of these patients in their twenties present on recall examination with these teeth erupted.

It has been shown that third molars do not cause crowding of lower anterior teeth. Clinically to cause crowding in a meshed dentition, the third molars would have to move all the posterior teeth mesially to account for this crowding. This would disrupt the meshed situation, which in fact does not occur.

If a third molar does present a problem and must be removed, why must all the other third molars be removed? This is practising elective surgery which should be frowned upon. No treatment is better than elective treatment when one considers all the discomfort, possible complications and expense.

I have radiographed impacted third molars annually in elderly patients and all is well. Some of these people I have referred to oral surgeons and they felt the patient was best without surgery.

I am wondering just how often the surgical extraction of wisdom teeth is really indicated? It is too bad we do not have a pathologist examine the specimens routinely as is done in the medical profession.

Dr. Mark Lazare DDS
Pointe Claire, Québec

SWIMMING POOL HAZARD

Persuant to the article on the Hazards of Erosion from Swimming Pool Water (C.D.A. Journal, November issue), I would like to entertain the possibility of another effect of pool water on teeth.

An unusual obvious brown stain was observed on the maxillary anterior teeth of a young patient. He received a prophylaxis and fluoride treatment only one day prior to the parent calling our attention to the stain. After inquiring about the activities that took place within the time frame of one day, it was thought that pool water from swimming may have explained the development of the stain on the teeth.

Consultation with members of a swim team occurred soon after. It was revealed that some of the members noticed an unpleasant discoloration of their teeth. The cause of this stain (the stain being consistent with that found on the child patient) has not been previously established.

This lead to some suspicions that there may be a component in swimming pool water capable of creating an extrinsic stain on teeth. Lately, we have not encountered further cases of stained teeth associated with people known to partake in extensive swimming regimens.

In the interest of linking swimming pool water with an extrinsic brown staining of teeth, it would be appreciated if persons having knowledge of any clinical cases (or information of this matter) would send the information to:

Room 2032
Faculty of Dentistry
Dentistry/Pharmacy Bldg.
University of Alberta
Edmonton, Alberta T6G 2N8

Eileen Jang
Fourth Year Dental Student

PRACTITIONER TAKES EXCEPTION TO REMARKS

I would like to draw your attention to an article entitled "Eighty-year old Canadian Periodontist is Enthusiastic Observer During a Recent Exchange Visit in China" Volume 49, Number 11 and specifically on Page 752.

"At the most modern appearing dental clinic we saw in a hospital, the head of the clinic told us they do not use acupuncture because "It takes too long and sometimes it does not work," he said."

I take exception to this type of remark for several reasons.

1. It has clearly and consistently been shown that acupuncture can be as fast or faster than local anesthetic.
2. It is as reliable as most other medical techniques.
3. It implies that acupuncture in dentistry is limited only to pain control—clearly an uninformed view.

I make these points as a practitioner and teacher of dental acupuncture over nine years. I have demonstrated the above statements as Past President of The Acupuncture Foundation of Canada and as Member of an Ontario Ministry of Health Task Force on Acupuncture, and as a teacher at national and international meetings.

I too was in China the same year as Dr. Charles Williams, but I was there as head of a delegation of The Acupuncture Foundation of Canada. Indeed, I lectured in China on acupuncture at Quangzhou Traditional College of Chinese Medicine, Wah Shan Hospital Neurological Institute, Shanghai Acupuncture Research Institute, Beijing.

I object also to the quoted statement because it implies the head of a clinic knows all aspects (including acupuncture) of dentistry in a diverse country. This isn't true in our country why should it be true in theirs? It also implies that knowledge in one country resides in superior status for all time in that country. This is truly a dangerous thought from educators.

I write this letter to make clear we have a useful tool that we neglect to our disgrace and peril.

Herbert J. Adirim, DDS
Toronto, Ontario

OBITUARIES/NÉCROLOGIES

ALBUS, L.W.: Dr. Albus, a graduate of the University of Toronto in 1979, was practising in an associate capacity in a practice in Amherstburg, Ontario at the time of his sudden death.

BAIRD, E.G.: Dr. Baird, a graduate of the University of Toronto, was a resident of Elmira, Ontario at the time of his death. He graduated from U. of T. in 1957.

BOOKER, R.E.: An oral surgeon and part-time faculty member of the University of Toronto Faculty of Dentistry, Dr. Booker was born in 1926. A well known resident of the Kitchener-Waterloo area of Ontario, Dr. Booker graduated from the University of Toronto in 1951.

BUGDEN, H.C.: Dr. Bugden, a resident of Ottawa, Ontario at the time of his death, had a distinguished career in dentistry. A fellow of the International College of Dentists and member of the Pierre Fouchard Society, Dr. Bugden was also active in the CDA. He was a former president of the Ottawa Dental Society and governor of the Ontario Dental Association. Born in 1919, he was a graduate of the University of Toronto in 1950.

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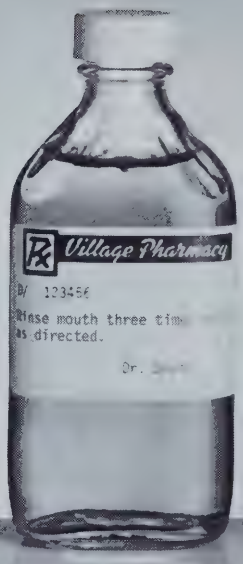

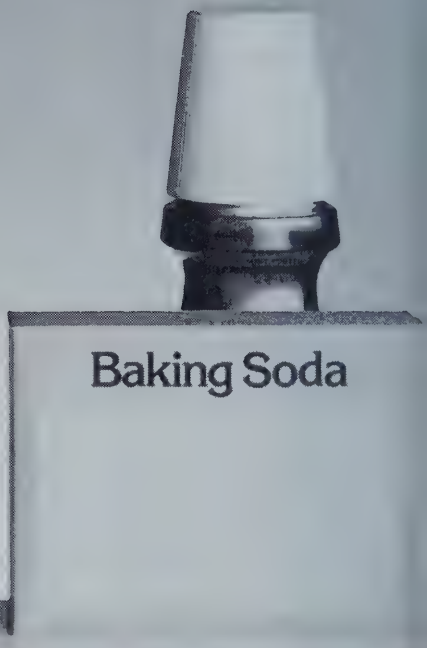

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HEPATITIS B

HEPATITE B

1. Ahtone, J. and Goodman, R.A. *Hepatitis B and dental personnel: transmission to patients and prevention issues*. Journal of the American Dental Association, v. 106, no. 2, February 1983, pp. 219-222.

Abstract: Hepatitis B virus (HBV) infection is considered an occupational risk for dental professionals. The Centers for Disease Control have participated in eight investigations regarding dental professionals who were suspected of transmitting HBV infection to their patients. This article summarizes the findings of the investigations, the postulated mechanism of transmission of HBV, control measures suggested, and follow-up of the dental practice for those dentists who were chronic carriers of hepatitis B surface antigen. The approach by the centers for managing dental professionals who are HBsAg positive and those dental professionals who are HBsAg positive and implicated as transmitting HBV infection to patients are outlined. If HBV transmission cannot be interrupted by suggested measures, then restrictive measures should be decided on by state or local health officials or both.

2. Barrett, E.D. *Questions regarding hepatitis B vaccination of dental personnel*. Journal of the Michigan Dental Association, v. 65, no. 1, January 1983, pp. 19-20.

3. Bass, B.D. and others. *Quantitation of hepatitis B viral markers in a dental school population*. Journal of the American Dental Association, v. 104, no. 5, May 1982, pp. 629-632.

4. Blozis, G.G. *Hepatitis B and dentists: a breakthrough in control is here*. Ohio Dental Journal, v. 56, no. 5, May 1982, pp. 12-15.

5. Cooley, R.L. Lubow, R.M. *Hepatitis B vaccine: implications for dental personnel*. Journal of the American Dental Association, v. 105, no. 1, July 1982, pp. 47-49.

Abstract: The available data indicate that a highly effective vaccine to combat hepatitis B has been developed. In a well-controlled, double-blind clinical study of a high risk group (male homosexuals), this vaccine stimulated the production of anti-HBs in more than 92% of the test group followed for two years. As a generalization, this new vaccine can be described as highly effective, safe, stable, and a welcome addition to preventive medicine. Dentists, in particular oral surgeons and periodontists, are in a high risk category with respect to hepatitis B exposure. This vaccine deserves considerable attention by these groups. All members of the dental profession should seriously consider the use of this vaccine as a personal and public health measure when it becomes commercially available.

6. Czaja, A.J. *Hepatitis and the dentist (editorial)*. Mayo Clinic Proceedings, v. 58, no. 8, August 1983, pp. 550-552.

7. Derrick, J.B. and others. *Response to hepatitis B vaccine in Canadian dental students (letter)*. Lancet, v. 1, no. 8265, January 23, 1982, p. 223.

8. Dungy, A.F. *Hospital aspects of dental trauma*. Dental Clinics of North America, v. 26, no. 3, July 1982, pp. 555-564.

9. Goebel, W.M. *Dentistry, hepatitis B and a vaccine*. Illinois Dental Journal, v. 52, no. 2, March-April 1983, pp. 84-88.

10. Jovanovich, J.F. and others. *The risk of hepatitis B among select employee groups in an urban hospital*. Journal of the American Medical Association, v. 250, no. 14, October 14, 1983, pp. 1893-1894.

Abstract: Hospital employees are at a various risk for development of hepatitis B infections. A retrospective review of surveillance records in five clinical areas at high risk for hepatitis B exposure was carried out to determine its prevalence and incidence in each area. The area surveyed with the highest risk was the emergency department. It was followed, in descending order, by the operating room, the medical and surgical intensive care units, and the dentistry-oral surgery clinic. The surveyed area at the lowest risk was the hemodialysis unit. In the emergency department, however, employees may be increasingly exposed to hepatitis B by dealing with life-threatening problems in an uncontrolled setting.

11. Main, J.H. and others. *The implications of viral hepatitis for the practice of dentistry*. Canadian Dental Association Journal, v. 48, no. 12, December 1982, pp. 756-761.

12. Metcalfe, T.D. *Hepatitis B as a potential hazard to dental patients*. British Dental Journal, v. 154, no. 3, February 1983, pp. 81-82.

13. Mochizuki, H. and Morimoto, M. *Incidence of hepatitis B virus infection in dental students during clinical training (letter)*. Journal of Infectious Diseases, v. 148, no. 1, July 1983, p. 181.

14. Reingold, A.L. and others. *Transmission of hepatitis B by the oral surgeon*, Journal of Infectious Diseases, v. 145, no. 2, February 1982, pp. 262-268.

Abstract: An outbreak of hepatitis B in southeastern Connecticut was traced to an oral surgeon. In a serosurvey of his 754 noninstitutionalized patients, 511 (68%) participated. The rates of seropositivity for hepatitis B surface antigen (HBsAg) or antibody to HBsAg by year of oral surgery were 4.8% in 1977, 7.4% in 1978, and 14.8% in 1979. The transmission of hepatitis B as measured by seropositivity, occurred between November 1978 and August 1979; the peak transmission was in February (31.2% seropositivity). Seropositivity was strongly correlated with extent of surgical trauma (P less than 0.0001). HBsAg subtyping revealed that the oral surgeon and all four subtypable patients demonstrated both d and y reactivity, as did the patient from whom it was most likely the oral surgeon acquired his infection: a mentally retarded patient who had 24 extractions in March 1978. This study demonstrates that the transmission of hepatitis B between dental practitioners and their patients frequently results in subclinical infections.

15. Sampson, E. and Dhuru, V.B. *Infection control in North American dental schools*. Journal of Dental Education, v. 47, no. 5, May 1983, pp. 329-335.

Abstract: Treatment of patients with transmissible infections is a particular concern in an institutional setting. This paper discusses the results of a questionnaire relating to infection control that was sent to all North American dental schools. The purpose of the survey was to aid in the development of a comprehensive protocol at Marquette University for treating patients with transmissible infections and, in particular, hepatitis B carriers. Currently, the dental community is reluctant to treat patients with a history of hepatitis and hepatitis B carriers. The protection offered by the recently available hepatitis B vaccine should contribute greatly to the reduction of transmission of hepatitis B. It is emphasized that the use of this vaccine in dental schools in no way obviates the need for meticulous infection control protocols.

16. Schaefer, M.E. *The use of hepa-*

titis B vaccine in U.S. dental schools. Journal of Dental Education, v. 47, no. 8, August 1983, pp. 550-551.

Abstract: A Questionnaire was sent to the deans of 59 dental schools in the United States. They were asked to indicate their plans for the use of the new hepatitis B vaccine, whether hepatitis B antigen-positive patients were treated in the dental school clinics, and if so, what special precautions were used. The requirements for serological testing of patients were also addressed. Fifty questionnaires were returned. Eight schools (16 percent of the respondents) had not formulated plans for the use of the vaccine. Thirty-one schools (62 percent) planned to use it for all students, faculty, dental assistants, and hygienists. In 74 percent of the schools planning to use the vaccine, the cost would be borne by the recipients; in 16 percent, costs would be paid by the institution. Several stated that the cost would be shared by both. Twenty percent of the respondents had not formulated plans for payment. The responses indicated that a great deal of indecision still exists among dental administrators as to the use of the hepatitis B vaccine and who will assume the cost.

17. Shovelton, D.S. *The prevention of cross-infection in dentistry*. British Dental Journal, v. 153, no. 7, October 5, 1982, pp. 260-264.

18. SyWassink, J.M. and Lutwick, L.I. *Risk of hepatitis B in dental care providers: a contact study*. Journal of the American Dental Association, v. 106, no. 2, February 1983, pp. 182-184.

19. Weil, R.B. *The dentist and the hepatitis B vaccine*. New York State Dental Journal, v. 49, no. 4, April 1983, pp. 234-235.

NEW LIBRARY ACQUISITIONS

TITRES EN BIBLIOTHÈQUE

The following current acquisitions are available on loan from the Resource Centre/Library.

Les titres indiqués ci-dessous sont maintenant disponibles à la bibliothèque/centre de documentation de l'ADC.

1. Canada. Health and Welfare Canada. *Canada Health Manpower Inventory 1982*. Ottawa: Minister of National Health and Welfare, 1983, 281p. Bilingual. 1 copy.
2. Canada. Parliament. House of Commons. *Report of the Parliamentary Task Force on Pension Reform*. Ottawa: Minister of Supply and Services Canada, 1983. 168p. 1 copy in English; 1 copy of French.
3. Medical Research Council of Canada. *Grants and Awards Guide, 1983*. Ottawa: Minister of Supply and Services Canada, 1983. 95p. 1 copy.

One copy of the following articles is available at no charge from the library to all CDA members. Non-members will be charged $5. This bibliography was generated with the help of MEDLARS, a computerized information retrieval system for the Health Sciences field, which has been operational at the library since February 1982, and is at the disposal of all members.

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Book Reviews

CLINICAL USE OF DRUGS IN PATIENTS WITH KIDNEY AND LIVER DISEASE

Robert Anderson and Robert Schrier (Ed.)

W.B. Saunders Company Canada, Ltd.
Toronto, Ontario
$87.50, 348 pages

The book compiled by Robert J. Anderson and Robert W. Schrier, consists of 20 chapters from 27 different contributors. The first four chapters describe the pharmacological principles which underlie differences of importance between the normal and the pathological liver and kidney with regard to their influence on both the toxicological and therapeutic effects of commonly used drugs.

Chapters five and eleven deal with drug induced liver and kidney disease while chapter twelve, in two parts, provides a useful and concise overview of drug use in patients with liver disease. The remaining chapters discuss the use of commonly prescribed drugs in patients with liver and kidney disease. One chapter discusses the use of dialysis and haemoperfusion in drug overdoses.

With regard to chapter fifteen, (antihypertensive agents and diuretics), there is mention of the lack of pertinent data for a number of agents. Thus not all commonly employed drugs in these categories are fully documented. In addition, the author expresses some unusual decisions on some clinical aspects of the treatment of hypertension and the safety of antihypertensive drugs. The chapter does not mention beta-blockers nor the stepwise approach to the treatment of hypertension. This chapter would have been better if the author had limited himself to the subject of altered drug pharmacokinetics in renal and hepatic patients.

With regard to chapter sixteen (cardiac glycosides and antiarrhythmic drugs), this provides good information on pharmacokinetics and offers a sound background for physicians who have to make a choice of anti-arrhythmic drugs for renal and hepatic patients. Beta-blockers are covered in this chapter.

Chapter seventeen deals with the treatment of Musculoskeletal Disorders. This chapter presents a different and much wider approach to the question of clinical use of drugs in renal and hepatic patients. The subjects are covered in a brief, uncomplicated way, useful for the general population of practitioners. Some data, however, are not up to date.

Chapter thirteen on anti-inflammatory agents is quite comprehensive and includes anti-bacterial, anti-fungal, anti-viral, anti-helmintic, anti-malarial agents, etc. Information on the metabolism and pharmacokinetics of these agents including the effects of renal and hepatic dysfunction is complete and accurate. Tables are provided at the end of the chapter to aid in the rapid identification of those anti-infective agents requiring dosage modification due to either renal or hepatic dysfunction.

There is a degree of incompleteness in that no information is provided for pediatric and geriatric patients in this chapter, and there is no information on many agents which have been marketed recently, such as; bacampicillin, cefotaxime, cefuroxime, cinoxacin, netilmicin and piperacillin.

This book is recommended as a textbook for both medical and dental students, and will be a useful reference book in the library for many practitioners in Canada.

This book was reviewed by
Ian W.D. Henderson, MD,
Director, Bureau of Human Prescription Drugs,
Health Protection Branch,
Health and Welfare Canada, Vanier, Ontario.

THE BEGG APPLIANCE AND TECHNIQUE

G.G.T. Fletcher

John Wright • PSG Inc.
Littleton, Massachusetts, 1981
$32.50, 169 pages

The text book entitled, "The Begg Appliance and Technique" is recommended reading for orthodontists interested in gaining introductory information on the Begg appliance. The Begg technique is "staged" and therefore lends itself to an organized presentation. Fletcher's strength is in making a technical explanation read like prose.

The author succeeds in gaining credibility by sorting out any weaknesses of Begg theory from those of orthodontics in general. The text sufficiently notes that any appliance technique is limited by the relative severity of the skeletal dysplasia. The author clearly states that certain extreme skeletal patterns may not be amenable to any isolated appliance therapy, including the Begg technique.

Other areas of credibility include the handling of the headgear and surgical questions. Headgears are not considered necessary if the operator has a good mastery of anchorage in the Begg technique. Mr. Fletcher recognizes that some of us less-than-perfect practitioners, superimposed on a patient's severe skeletal pattern, may require headgear to support the posterior anchorage. He also recognizes that severe skeletal dysplasias may require a combined orthodontic-surgical approach. No grand claims are made for orthodontic correction of Class III problems.

Mr. Fletcher does lose some credibility by not supporting statements with references. There seemed to be a conscious effort to make the text read easy, and therefore referral to previous publications may have been purposely omitted.

The text's second chapter (Synopsis of Factors Influencing The Pattern of the Adult Occlusion) proposes several theories of dental development. The vertical dimension, in conjunction with perioral pressure, comes into play.

Mr. Fletcher spends time developing the concept that mild anterior-posterior skeletal discrepancies may be deceivingly difficult due to extremes in the vertical plane. He devotes a chapter (7) to "The Problem of Increased Overbite: The Prognosis for Correction". All orthodontic appliances struggle with the problem of decreased overbite, or open-bite. The Begg appliance is obviously no exception as Mr. Fletcher omits a chapter examining open-bite problems.

Understanding the application of any appliance, including the Begg appliance, is dependent upon our understanding of growth and development. Mr. Fletcher departs from the usual orthodontic text's organization by weighing the early sections with appliance technique. I feel this was another conscious effort to enable the text to "read" easier. Some of the more important diagnostic and treatment planning concepts may have been presented earlier, and possibly repeated in the appliance application areas.

Mr. Fletcher fittingly sums up the "Begg" versus "edgewise" discussion in a short candid section in Chapter 14 entitled "Dual

Purpose Brackets''. The controversy is simplified by his statement: ''To tilt or not to tilt is a fundamental question where orthodontic appliances are concerned''. I highly recommend this short section to those of us who adhere strongly to our respective techniques. A quotation from Mr. Harold MacMillan is isolated on a page prior to the preface; ''I myself feel that one should not be tied to a dogma if it is a piece of mechanism. If it is a principle that is different''. It is important to note that in a book devoted to an appliance technique, the author takes special care to emphasize the importance of theory.

This book was reviewed by Barry D. Hoffman, DDS, MS, Calgary, Alberta.

AN ATLAS OF THE SURGICAL MANAGEMENT OF PERIODONTAL DISEASE

Henry M. Goldman,
Alan M. Shuman and
Gerald A. Isenberg

Quintessence Publishing Co. Inc.
Chicago, Illinois, 1982
219 pages

This Atlas would be a valuable addition to the library of the general practitioner and post graduate student in Periodontology. In the preface the authors state that the purpose of this text and atlas is to acquaint practitioners with the periodontal surgical techniques employed today. Contents of this text include a discussion of the objectives of periodontal therapy, prognosis, clinical periodontal procedures, the role of the tooth surface in the management of periodontal disease, management of periodontal pockets where there is insufficient attached gingiva, periodontal flap surgery, management of the bone in periodontal surgery, management of the incipient furcal involvement, root proximity of the maxillary molar teeth, tooth sectioning.

Basic surgical procedures are covered admirably and this text accomplishes its purpose in an effortless, simplistic and efficient manner. Unlike many textbooks of Periodontology it is possible to zero in on an area of interest and to quickly assimilate the salient points regarding theory and technique. Since this book is presented as an atlas it does not purport to provide a lot of voluminous detail on background material and research findings. Although most topics are handled smoothly there is a tendency to skirt many controversial areas in periodontal therapy.

Although the Periodontist would enjoy reading this book he or she may find it a little too basic in nature. More specialists would be attracted to this book if there were more cases illustrating techniques of regenerative therapy. Only one osseous case is presented in the atlas and the section on muco-gingival surgery is lacking in the coverage of a variety of techniques used in soft tissue repair of denuded root surfaces. One would not expect much histology to be incorporated in a text of this nature but some basic histology showing the results of some of the therapy might be beneficial. Some discussion of post operative maintenance would also have been appropriate.

The color atlas section which demonstrates the clinical procedures is well organized. There are a great number of illustrations which are uniformly excellent. Superb photography and exquisite surgery should be the order of the day in a color atlas of this type. Although most of the osseous photos are excellent and the surgery of a very high standard, some of the muco-gingival surgery is less impressive and the photography of a lower calibre.

In summary the book is very good. This atlas fills a real void in the area of periodontal texts for the instruction of clinical techniques. All in all this book would be highly recommended for practitioners in all disciplines of dentistry.

This book was reviewed by Claude G. Ibbott, DMD, FRCD(C), Regina, Saskatchewan.

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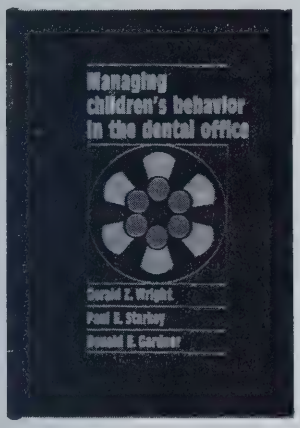

Managing Children's Behavior in the Dental Office

by Gerald Wright, Professor and Chairman, Division of Pedodontics, University of Western Ontario

Using a unique approach, this book explores child management in the dental office. Cases that represent typical behavioral problems and incidents have been used to introduce some of the chapters dealing with problems faced by members of the dental profession while treating children. More than one alternative is presented. Because managing children is a team effort, the authors have included information useful to the dentist's assistants. This book is certainly to be a valuable asset to dentists, their auxilliaries, the children and their parents as well. Pub. 1983. 352 pages. 125 illust. ISBN 5666-5 $38.00

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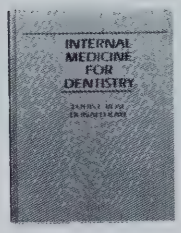

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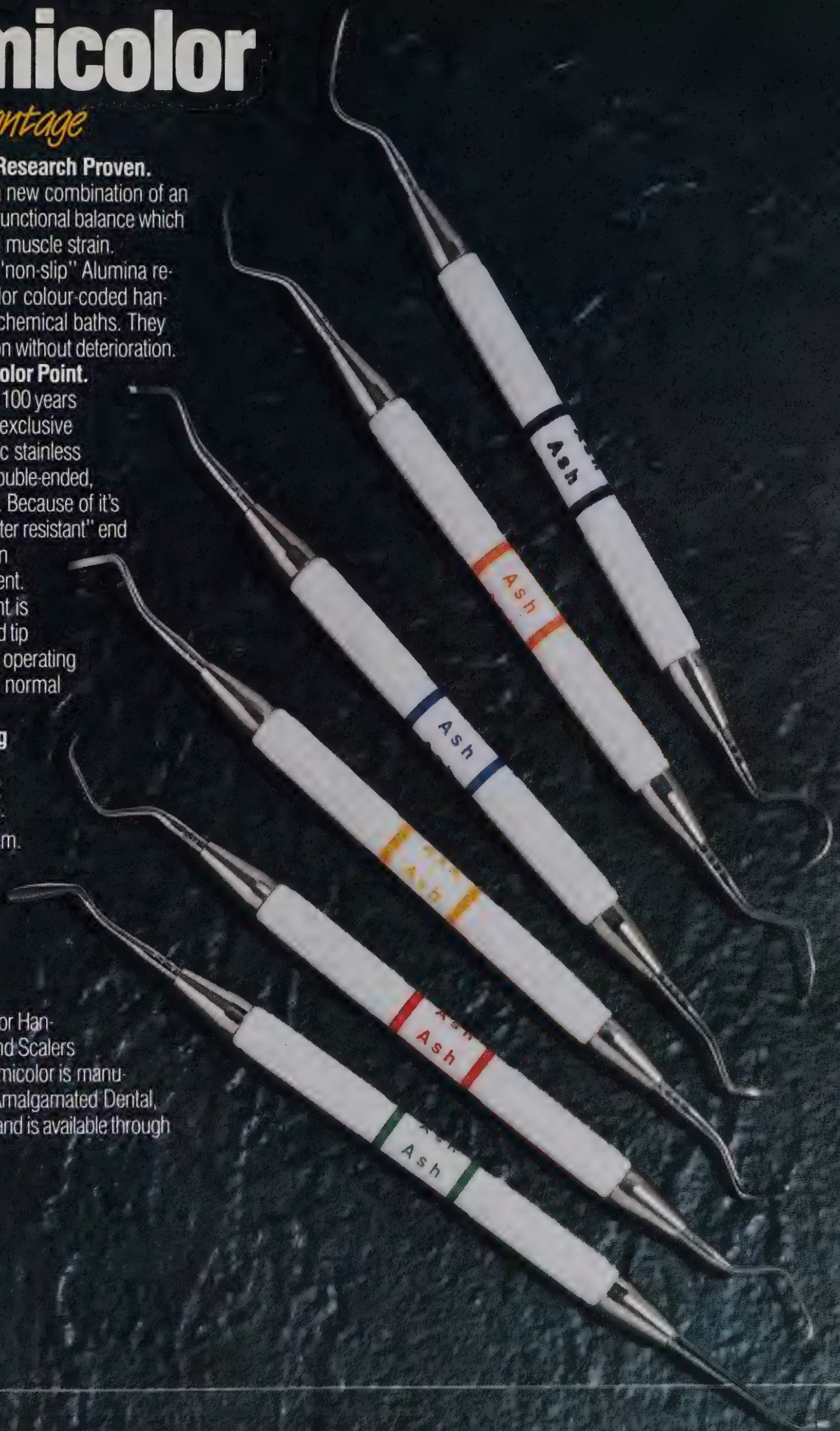

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9 Give Yourself an Annual Check-Up
Your insurance needs change from year to year along with your age, financial circumstances, family situation, practise, and your property. Insurance changes, too, as new policies and new features (like non-smokers' life insurance rates) become available. Review your coverage and your needs thoroughly each year. You may find opportunities to reduce or eliminate some coverage.

10 Check Your Associations' Plans First
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PERIODONTICS

SO WHAT'S NEW?

by Dr. Harvey L. Freeman
Assistant Professor
Faculty of Dentistry, University of Toronto

INTRODUCTION

Recently dental practitioners have been bombarded with mailings for postgraduate courses. Some of these are sponsored by universities or dental organizations while others are commercial enterprises, or even privately sponsored meetings. Some of these courses profess to have a "new" or "better" way to treat periodontal disease. They usually claim to be able to eliminate the necessity for surgery, thus making the procedures attractive to people who have to face the unhappy thought of periodontal surgery. Are these therapies more effective and are they, in fact, new procedures?

Some of these new thoughts are based on antibiotic and other drug dependent or chemical forms of therapy. Another relates to the application of citric acid to the roots affected by advanced periodontitis. Yet another area of confusion in periodontics concerns the treatment of infrabony pockets. Several commercial products have been introduced and heavily marketed to the profession. Many of these concepts and materials seem to echo theories from the past. This article will attempt to discuss their usage in light of today's current knowledge.

INTRODUCTION

Dernièrement, les praticiens dentaires reçoivent de nombreuses lettres leur proposant des cours au niveau supérieur. Certains de ces cours sont parrainés par des universités ou des organismes dentaires, tandis que d'autres le sont par des entreprises commerciales. Il y en a même qui relève d'initiatives privées. D'après certains, il y aurait une nouvelle *ou une* meilleure *façon de traiter la maladie parodontaire. Habituellement, on prétend pouvoir éliminer le besoin des interventions chirurgicales, espérant ainsi que les procédures plairont aux personnes à qui toute idée d'opération répugne. Ces thérapies sont-elles plus efficaces? Constituent-elles de nouvelles procédures? Qu'en est-il vraiment?*

Quelques-unes des nouvelles idées se rapportent à l'utilisation d'antibiotiques, d'autres drogues ou de procédés chimiques. Une autre préconise l'application d'acide citrique sur les racines atteintes d'une parodontite avancée. Par ailleurs, la confusion règne toujours au sujet des culs-de-sac sous-osseux. De nombreux produits commerciaux ont fait leur apparition, inondant le marché et rendant les dentistes plus perplexes. La plupart de ces notions et de ces matériaux semblent répondre à des théories du passé. Le présent article discute leur utilisation à la lumière des connaissances actuelles.

The Keyes Technique:

This approach is being advocated by Paul Keyes, a former microbiologist with N.I.H. in the United States. His approach utilizes sodium bicarbonate and hydrogen peroxide in a slurry to be used as a tooth cleanser and antiseptic which would combat bacterial plaque in the mouth. Tetracycline on a long-term basis is also suggested in advanced periodontal disease situations.

Dr. Keyes claims that he is looking at periodontal disease through a microscope in order to visualize bacteria. Advocates of the approach inspect samples of the patient's plaque through a phase contrast microscope looking for spirochetes and motile rods. These organisms are present in large numbers when samples from advanced cases of periodontal disease are observed. When plaque is removed and new samples are viewed through the microscope, we see a predominance of cocci rather than filamentous forms, rods, and spirochetes.

This information is not new. In fact, in the early 1900's dental scientists had observed an abundance of spirochetes in plaque of advanced periodontal disease and an absence of spirochetes in plaque of healthy individuals. These early investigations assumed that the spirochete was indeed the villain and suggested the use of Neosalvarsan as a therapeutic agent.[1] Neosalvarsan was a drug used at that time for spirochete diseases such as syphilis. The advocates of this therapy also scaled the teeth and noticed considerable improvement. By approximately 1925 clinicians had become disillusioned with the approach as Neosalvarsan did not seem to work in all cases. Today it is simply an historical anecdote. Of course, the value of scaling has endured the test of time and no one questions its value. The impressive improvement seen by these early workers is likely due to the removal of plaque and calculus by scaling rather than the Neosalvarsan.

Another difficulty that is encountered when one samples plaque is that the microbiota varies not only between various stages of periodontal disease, but also between individuals with similar symptoms. In addition, the microbiota of the pockets may be different in various parts of the mouth and even in various parts of a particular gingival pocket.[2] Thus it can be seen that samples of bacterial plaque are not at all consistent and at this time there is no clear cause and effect relationship between specific bacteria and the pathogenesis of periodontal diseases. Certain bacteria are more suspect then others, but their guilt is by no means absolute. The use of phase contrast or dark field microscope as a diagnostic instrument to evaluate a patient's periodontal condition is not really valid either. A more accurate assessment can be made by the use of a periodontal probe.[3] Other information such as tissue consistency, adaptation to the tooth, bleeding, suppuration and x-rays are invaluable aids in measuring the extent and progress of the disease.[4,5] The probe has its shortcomings but, at this time, it is the best tool we have and more reliable than the microscope. In fact, the microscope may be quite misleading when trying to determine the progress of periodontal diseases. Its use presumes that we actually know which micro-organisms are the pathogens, and that we can predict the damage that these pathogens will inflict on the periodontium. Alas, we are not yet at that point in our understanding of the disease process.

Several studies have been undertaken to evaluate the Keyes method under controlled situations. They basically all have come to

the same conclusion toothbrushing with peroxide and sodium bicarbonate is not different from toothbrushing with a tooth powder and water.[6] Other studies have essentially produced the same results and have concluded that there is no statistical difference between the controls and those using sodium bicarbonate with peroxide. They stated that improvement observed in both groups was a result of improved oral hygiene. It is somewhat surprising that Keyes as a former research scientist has been making claims for the peroxide sodium bicarbonated method without doing any controlled studies to evaluate its effectiveness. Incidently, the use of sodium bicarbonate and peroxide certainly did not originate with Keyes and has been known for many decades.

Antibiotics:

Since periodontal disease appears to be caused by bacteria many feel that antibiotics alone would be successful in treatment. This also is certainly not a new concept. Reports indicate that in some conditions, antibiotic therapy can be a helpful adjunct to conventional techniques.[8,9,10] In patients with juvenile periodontitis, a treatment programme including tetracycline, root instrumentation and soft tissue curettage, resolved the lesions and, in 90% of cases, prevented disease recurrence.[11] This is very exciting news considering that at one time juvenile periodontitis was considered a hopeless situation that we did not understand and therefore could not treat. But, in general, long term trials in humans describing the effect of such adjunctive therapy is still lacking. The plaque studies of recent years have revealed that the microbiota in advanced periodontal lesions is dominated by gram negative, anaerobic or capnophilic rods. These bacteria prove to be sensitive to tetracycline when tested in vitro and this had led to the acceptance of tetracycline as a treatment modality. However, clinical trials performed in humans with adult forms of periodontal disease have failed to reveal an additional effect of tetracycline above what can be accomplished by scaling and root planing.[8] Tetracycline used alone, without concomitant mechanical debridement, has no prolonged therapeutic effect.

Other drugs such as metronidazole (Flagyl), which is active against the anaerobic segment of the microbiota, spiramycin and clindamycin have also been tested but additional studies are required to assess the efficacy of these compounds in periodontal therapy.[12] A very recent study by Clark et al[13] reported that no significant difference could be observed between controls and those using metronidazole in a sample of mentally retarded adolescents.

Antiseptics:

The antiseptic which has received the most attention in the past decade is chlorhexidine digluconate (Hibitane). A tremendous amount of research has been dedicated to this product especially in the Scandinavian countries. The early reports were most enthusiastic and it seemed that the answer to all problems had been found. It turns out though that Chlorhexidine is of limited value in the treatment of advanced periodontal disease with deep periodontal pockets. Furthermore, the clinical use of chlorhexidine has revealed some side effects. Discolourations of teeth, fillings and the dorsum of the tongue are almost always seen in patients who are regular users. Some patients complain about the bitter taste of the drug and interference with the sense of taste.[12] It is a useful adjunct where difficult mechanical cleansing is a problem and it is also effective in patients suffering from acute necrotizing gingivitis.[12] But certainly, it is not the panacea that many predicted.

At this time there are no mouthwashes, antimicrobial or chemical agents that can prevent the formation of, or disrupt already formed bacterial plaque without some side effects. These side effects can manifest as discolouration of teeth, an imbalance of the intestinal flora, allergy to the drug, production of resistant strains of organisms, opportunistic infections such as candidiasis which may occur orally or even as a vaginal infection. The price one must pay for chemical therapy may sometimes outweigh the advantages. The use of these compounds must be evaluated for each patient and then judicially applied if it is to the patient's advantage.

Amoebae and Periodontal Disease

Another approach has recently been advocated by Lyons et al[15]. Their treatment is based on the microscopic examination of plaque and the presence of such parasites as Entamoeba Histolytica and Treponema. Treatment is then instituted with such antiparasitic drugs as metronidazole.

Again we find that this approach is not new.[1] In 1907 reports were published in England which indicated that more amoebae were found in the more severe cases of periodontal diseases. In those days, they used Gentian violet or an emetic drug known as Emetine to solve the problem. This treatment lasted until about 1923. It fell into disrepute because the amoeba was also found in healthy situations. The other problem with this approach is the histological staining characteristics for amoeba. According to Socransky[1], the stain is rather specific. His example cited a situation where three million bacteria and three amoeba may b on a given slide. The stain for amoeba woul feature the three amoeba. Obviously thi would not represent the true microbiologi cal situation. It is not likely that the amoeb is the casual agent in periodontal disease a they are not present in sufficient numbers Nor is its presence a good diagnostic tool Incidently, the Emetine may have had som effect as it has an anti-inflammatory com ponent. However, it does seem to be a rathe harsh form of treatment.

Where does this leave the practitione who is seeking to provide the best periodon tal care for his or her patient? There are n miracle drugs that provide long-term effec tive therapy and yet have no side effect which may be harmful to the patient. Suc cessful long-term arrest of periodonta disease depends on a daily program o plaque control by the patient plus periodi scaling, root planing and review of th patient's plaque control efficiency. We hav known this for some time and at this point I see little evidence to support a differen approach. Other forms of therapy depen on the severity and progression of th disease. For instance, periodontal flap sur gery is utilized to gain access for debride ment and root planing in deep pockets Periodontal therapy can be very successfu or very frustrating especially when tryin to evaluate different types of therapy. Wha is quite clear is that we certainly do not hav all the answers. We must strive for bette understanding of the disease processe involved and eventually more effective an simpler treatment will be found. However we must be selective in our approach an treatment methods must stand up to care fully controlled evaluation. Clinical impres sions can often be quite misleading and are of course, quite biased.

Infrabony Pockets

Several new approaches are also bein recommended for treatment of infrabon pockets. The latest of these methods includ treatment of the root with citric acid and th rise of synthetic grafting materials.

Citric Acid

The use of citric acid to try and achiev new attachment arose from studies o repair of surgical wounds in animals.[1 Following removal of root cementum fro the periodontitis-affected part of the roo citric acid at pH1 is applied to the dentin su face for three minutes. The superficial zon of the root dentin thereby becomes demine alized which leads to denudation of the co lagen fibils of the dentin matrix. A conne tive tissue attachment will, according t Ririe et al[17], ''be established by interdig tation of new and old collagen fibrils at th tooth – gingiva interface''.

This method looked quite promising at first, however, more recent evaluations have not been as favourable.[18] Further research is required before its introduction in clinical practice is recommended.

Synthetic Grafting Materials

Synthetic grafting materials have received considerable publicity during the last few years. In response to the alleged claims of success by the manufacturers, the American Academy of Periodontology has issued a statement on synthetic bone grafting materials.

There are basically two kinds of synthetic grafting materials: non-resorbable hydroxylapatite (Periograf) and resorbable betatricalcium phosphate (Synthograft). "From the available literature, it is evident that these materials can be used as fillers of bony defects since they are well tolerated and seem to produce no foreign bony reaction in short term studies. However, any claims of increased body regenerations, effectiveness in defect resolution, or predictability seem generally unsubstantiated at this time. The potential environment is questionable since most of the reports have shown only connective tissue encapulation of the implanted particles. Furthermore, the objective of new attachment procedures is not only to regenerate alveolar bone, but also the attachment apparatus. Claims of regeneration of the periodontium cannot be substantiated from the reported literature at this time".[19] The Academy of Periodontology report[19] goes on to say that the use of these materials has to be considered as experimental since their effectiveness and predictability have not been substantiated. They should be considered as fillers in the treatment of infrabony defects.

If this sounds confusing, I agree. At the recent meeting of the American Academy of Periodontics a symposium featured three speakers. One favoured the use of citric acid and curettage, one preferred synthetic grafts and the third advocated the use of allograft bone in the infrabony pocket. The question period provoked this statement from one of the speakers, "Everything works and nothing works". Of course there is a great deal of truth in that statement. It demands that we carefully evaluate and measure each procedure to find out if it really does work. Many experts feel that the synthetic materials are simply products of vigorous marketing rather than careful research and it is up to us to find out the truth.

CONCLUSION:

Everything mentioned in this review is really material which has been considered in the past. Many products such as plaster of paris, bovine bone etc. have been utilized to fill infrabony defects. A variety of chemicals and drugs have been tried over the years to try to arrest periodontal disease. Citric acid is not a new product in periodontics, nor is sodium bicarbonate and hydrogen peroxide. Many workers have advocated antibiotics and antiseptics but so far the perfect solution has eluded the profession. Different bacteria have been accused of causing periodontal disease over the years and it seems that spirochetes and the amoebae are again gaining popularity in some circles. One is inclined to use the musical phrase "everything old is new again".

It seems that nothing is really new. These are all variations on old themes. Some may turn out to be valid or perhaps none will have a meaningful impact on periodontal therapy in the future. We must keep looking for new treatments but beware of the traps of untested enthusiasm or commercial marketing of unproven materials or methods. Periodontal therapy is a branch of dentistry which is unique in that the dentist cannot restore the periodontium. We can prepare the mouth for healing but, ultimately, the body heals itself. This is often a slow and frustrating process and the temptation to believe in a relatively easy solution is great. But a certain truth emerges with all this talk of methods and materials — the mouth must be kept plaque-free to maintain periodontal health.

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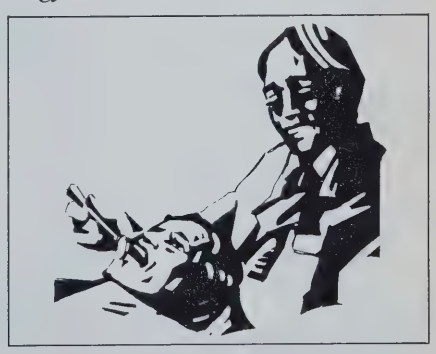

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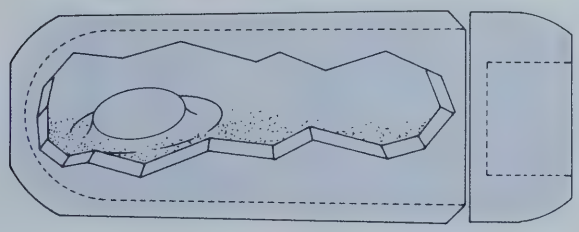

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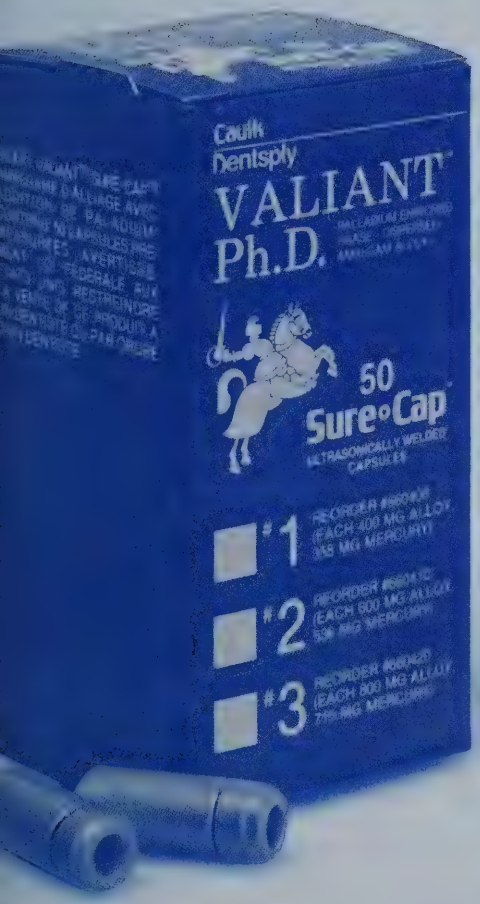

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De nombreux assureurs offrent avec leurs contrats des options qui élargissent les garanties, mais que vous devez payer en plus. Par exemple, une assurance invalidité pourra comporter en option la garantie décès accidentel, ou encore un supplément d'indemnité en cas d'hospitalisation. Ce genre de combinaison de garanties revient généralement plus cher que les mêmes garanties souscrites séparément.

2 Attention aux franchises

Si vous optez pour une franchise peu élevée, vous êtes un peu plus couvert mais à un prix nettement plus élevé. En assurance du contenu par exemple, vous pouvez économiser de 10 à 15 % par an en prenant une franchise de $ 500 au lieu d'une franchise de $ 250. Avez-vous encore une franchise de $ 100 en collision pour votre voiture ? Vous paierez nettement moins avec une franchise de $ 250.

3 Renseignez-vous

Vous verrez que pour un même contrat, il peut y avoir de grosses différences de prime d'une compagnie à l'autre. Pour une assurance vie temporaire de 5 ans, renouvelable jusqu'à 65 ans et avec un capital assuré de $ 250 000, la compagnie A exigerait une prime annuelle de $ 1 395 pour un dentiste de 45 ans, tandis que la compagnie B demanderait $ 1 200 et la compagnie C seulement $ 890. (La prime du régime d'assurance des dentistes du Canada n'est que de $ 839.) Comment être certain que les garanties sont comparables ? Le régime de votre profession se fera un plaisir de vous aider. Commencez par nous appeler.

4 Un peu de prévention

Quelques précautions élémentaires peuvent vous aider à éviter que de graves sinistres n'atteignent votre cabinet, et il n'y a pas de meilleure manière de prévenir les augmentations de prime. Conservez uniquement la quantité minimum d'or et d'amalgame sur place. Veillez à avoir de bonnes serrures, portes et fenêtres. Coupez l'arrivée d'eau à votre fauteuil d'opération quand vous partez. Si vous envisagez de prendre de nouveaux locaux, assurez-vous qu'ils possèdent de bonnes installations de sécurité et de prévention des incendies.

5 Et vos vieux contrats ?

Vos contrats d'assurance vie souscrits il y a 15 ou 20 ans peuvent avoir perdu une grande partie de leur valeur réelle en raison de l'inflation. Il sera souvent préférable de les résilier et d'affecter la valeur de rachat à des placements ou au remboursement d'un prêt hypothécaire.

6 Pourquoi payer d'avance ?

Les compagnies qui n'augmentent pas leur prime d'assurance vie ou d'assurance invalidité au fur et à mesure que vous vieillissez vous font en réalité payer plus que vous ne devriez aujourd'hui pour que vous ayez moins à payer demain. L'assureur dispose ainsi de sommes que vous pourriez vous-même utiliser pour prendre de l'expansion, payer votre prêt hypothécaire ou faire des placements. Le régime d'assurance des dentistes du Canada n'offre pas ce genre de modalité parce qu'il estime qu'il n'est pas avantageux pour vous de payer d'avance.

7 Traitez avec ceux qui connaissent la profession

Les besoins d'assurance des dentistes sont différents de ceux des membres d'autres professions. Vous avez besoin de conseillers qui ont une connaissance pratique de vos problèmes et de vos risques. Les assurances que vous propose votre association ont été mises au point par des dentistes en activité, en étroite collaboration avec des spécialistes des assurances, pour que vous ne risquiez pas de vous retrouver avec des garanties conçues pour d'autres.

8 L'assurance et l'épargne sont deux choses différentes

Certaines assurances vie combinent une garantie en cas de décès et un élément épargne pour l'avenir. Elles sont habituellement chères pour des assurances, et peu rentables comme instrument d'épargne. Elles ont souvent pour effet de bloquer vos économies, ce qui vous enlève toute possibilité de transfert pour profiter des meilleurs rendements. Il vaut mieux, du point de vue efficacité et rentabilité, souscrire une assurance vie temporaire pour protéger les personnes à votre charge et mettre sur pied un programme d'épargne et de placement distinct.

9 Passez-vous en revue tous les ans

Vos besoins d'assurance changent d'année en année avec votre âge, votre situation financière, votre situation de famille, l'évolution de votre cabinet et celle de votre patrimoine. L'industrie des assurances elle aussi change, à mesure que de nouveaux produits ou de nouvelles modalités (les tarifs non-fumeurs par exemple) font leur apparition sur le marché. Faites chaque année une revue approfondie de vos garanties et de vos besoins. Vous trouverez peut-être la possibilité de réduire ou de supprimer certaines garanties.

10 Voyez d'abord les assurances de votre association

Les assurances qui vous sont proposées par votre association sont habituellement moins chères que celles que vous pouvez vous-même vous procurer auprès des assureurs. Quand vous avez besoin d'assurance, vous gagnez à voir d'abord le régime d'assurance des dentistes du Canada. Même si vous décidez de souscrire votre assurance ailleurs, vous aurez un bon outil de comparaison.

Le régime d'assurance des dentistes du Canada

Pour un service personnalisé ou pour tout problème d'assurance, contacter le Service de renseignements du CDSPI, à n'importe quelle heure, sans frais :

1.800.268.54.18 *Provinces de l'Ouest, provinces atlantiques et région de l'Ontario avec l'indicatif régional 807*

1.800.268.34.11 *Québec et Ontario,* ***sauf*** *pour la région avec l'indicatif régional 807*

497.71.17 *Toronto et environs*

Régimes parrainés par vos associations dentaires nationale et provinciales et administrés par le Canadian Dental Service Plans Inc., 2, square Lansing, Bureau 600, Willowdale, Ontario, M2J 4Z3.

WILL THE DIETS OF THE FUTURE BE LESS CARIOGENIC?

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Series Continued

Presentations at 'Symposium 25'

In February, the Journal began publication of the 15 papers presented at "Symposium 25", an event which marked the 25th Anniversary of the Faculty of Dentistry at the University of Manitoba in Winnipeg.

In this edition a further three of the eight papers on the subject of caries research, are being published.

The Journal will later publish papers on the subject of periodontal diseases, which were also presented on this occasion.

INTRODUCTION

The question posed in the title of this communication emphasizes the known role of diet in the formation of human dental caries. The ingestion of foods containing fermentable carbohydrate causes the production of acids by plaque bacteria on the surfaces of the teeth. The acid can cause demineralization of the tooth enamel and repeated acid attacks can eventually lead to the formation of carious lesions.

In order to evaluate whether the diet of the future will be less cariogenic it is necessary to look at what is currently known about the cariogenicity of foods and what might be done to alter the challenge to the teeth from the diet. Significant research on the role of diet in dental caries has been performed during the past decade. Progress has been made in enhancing our understanding of: (1) the process of acid production by dental plaque; (2) methods for monitoring changes in plaque pH; (3) the role of various dietary carbohydrates in plaque acid production; (4) the acidogenic potential of ingested foods; (5) the ranking of foods based on their cariogenic and acidogenic potentials; (6) nonacidogenic foods; (7) potential anticariogenic foods; and, most important, (8) how caries may be prevented by dietary means.

The following discussion will present an overview of the status of our understanding of the relationship of diet to human caries formation. Based on our increased knowledge about this relationship and some new and exciting research findings it will be projected that the diet of the future will be less cariogenic. The means by which this can be achieved will require the development and utilization of new foods. There is little doubt that products can be made which will markedly reduce the acidogenic challenge to the teeth from the diet and also stimulate the repair of demineralized enamel. It is projected that such products will be available in the near future.

INTRODUCTION

La question posée dans le titre de cet exposé souligne le rôle que l'on sait que le régime alimentaire joue dans la formation des caries chez les humains. L'ingestion d'aliments contenant des hydrates de carbone fermentescible entraîne la production d'acides sous forme de bactéries en plaque à la surface des dents. Ces acides peuvent causer la déminéralisation de l'émail dentaire et, après des attaques répétées, il se produit éventuellement des lésions carieuses.

Afin de déterminer si le régime alimentaire de l'avenir sera moins cariogène, il convient de s'arrêter à ce que l'on sait déjà au sujet du pouvoir cariogène des aliments et de se demander ce qu'on peut faire pour enrayer le danger que ceux-ci représentent pour les dents. Durant la dernière décennie, d'importantes recherches ont été menées touchant le rôle du régime alimentaire dans la formation des caries. Des progrès ont été réalisés, améliorant notre compréhension: 1) du procédé suivant lequel se produit l'acide sous forme de plaque dentaire; 2) des méthodes qui contrôlent les changements du pH dans la plaque; 3) du rôle de différents hydrates de carbone dans la formation de l'acide qui produit la plaque; 4) du pouvoir acidogénique des aliments ingérés; 5) de la classification des aliments suivant leur pouvoir acidogénique et cariogène; 6) des aliments non acidogéniques; 7) des aliments possédant des pouvoirs anti-cariogènes; 8) et surtout de la manière dont on peut prévenir les caries par des moyens alimentaires.

Le présent exposé offre un aperçu général sur l'état de nos connaissances touchant les rapports entre le régime alimentaire et la formation des caries chez les humains. Parce que ces connaissances sont maintenant plus étendues et qu'il y a eu des découvertes intéressantes, on peut prédire que le régime alimentaire de l'avenir sera moins cariogène. Pour ce faire, il faudra mettre au point de nouveaux aliments et en répandre la consommation. On ne doute guère aujourd'hui qu'on puisse fabriquer des produits qui réduiront de façon marquée le pouvoir acidogénique des aliments sur les dents et accélèreront la régénération de l'émail déminéralisé. On prévoit que de tels produits seront disponibles très bientôt.

DISCUSSION

Acid production by dental plaques

Dental plaque can be described as a mat of bacteria which covers human teeth and which is not removed by rinsing with water.[1] During the past decade, our understanding of the formation[2,3] and metabolism[4,5] of plaque has increased to a level which allows us to appreciate the complex nature and many potential activities of this material.

Two unique features of plaque are the high density and heterogeneity of its bacterial populations. Plaque can be shown to contain approximately 1×10^{11} bacterial cells per gram of wet weight, and at least 50 species of bacteria have been isolated from human dental plaque.

The concentrated localization of bacteria on the tooth surface results in the placement of a large amount of metabolic potential at sites where interactions with ingested substrates can readily occur. In the anaerobic environment of plaque, the fermentative capacity of the bacteria is not only localized but is very efficient in converting dietary carbohydrates to acidic metabolic end products. Although the exact stoichiometry of substrate conversion to products within such a concentrated and complex mixture of bacteria would be impossible to describe, it is very clear that plaque has the capacity to rapidly convert carbohydrates to acids, which can cause a rapid drop in pH (**Figure 1**). The fall in plaque pH and the subsequent return towards resting pH levels produces a curve which has been named after Stephan who first described this phenomenon in detail.[6] It is clear that as the plaque pH falls a concentration of acid will eventually be reached which will cause demineralization of the enamel adjacent to the plaque. This "critical pH" has been projected to be somewhere between 6.0 and 5.0. It is obvious that in the mouth this value could vary between various tooth surfaces depending upon a complexity of local factors.

The production of acid by dental plaque has been shown to favor the survival of certain plaque bacteria and to reduce the level of some species.[5] With time, and repeated rounds of acid production, a highly acidogenic and aciduric population of bacteria is selected and these bacteria can eventually dominate the plaque microbial community. Certain strains of *Streptococcus mutans* and lactobacilli have been implicated as primary pathogens for caries formation in humans due to their ability to survive at low pH and produce large quantities of plaque acid.

It should be emphasized that the production of acid by plaque plays an essential role in the development of dental caries. Means to reduce the acidogenic challenge to the teeth would surely reduce demineralization of enamel and the formation of lesions. The focus of much of the work which will now be discussed has been directed at evaluating plaque acid production and ways to alter this process.

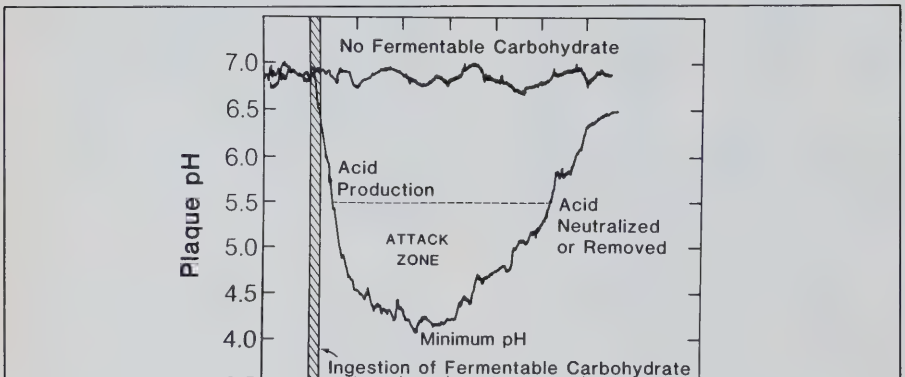

Fig. 1. Representative Stephan curve obtained by wire telemetry from a buccal tooth surface following a 10 percent sucrose rinse. Acid is rapidly produced by plaque bacteria causing the pH to fall to a minimum level. With time, the pH returns toward the resting pH level as the acid is removed or neutralized. Note the lack of response in the absence of fermentable carbohydrate and a theoretical "attack zone" under pH 5.5 representing the pH level and time interval when the tooth enamel may be demineralized by the acid.

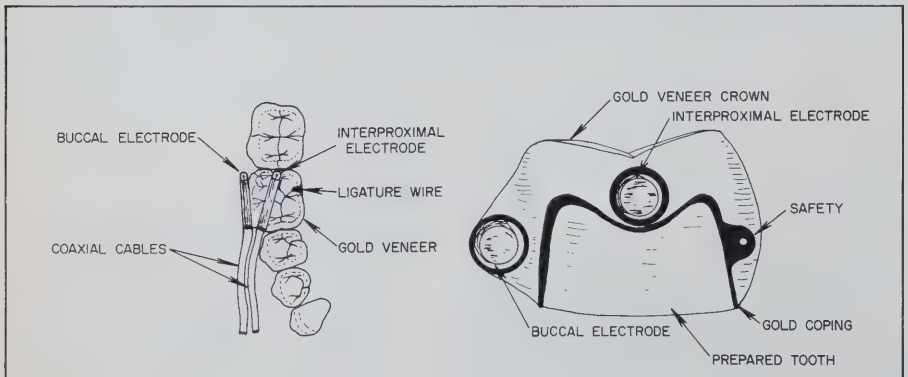

Fig. 2. An appliance used for wire telemetry from both buccal and proximal tooth surfaces. The microelectrodes are connected with coaxial cables to a pH meter and recorder.

Methods for monitoring changes in plaque pH.

Three methods currently used to follow changes in human dental plaque pH have recently been reviewed and the complex host, microbial and substrate factors which can alter this process have been discussed.[7] A technique usually referred to as "plaque sampling" has been used with considerable success by a number of investigators. In this method plaque is allowed to accumulate in the absence of oral hygiene and then is removed from the teeth at intervals following food ingestion. Samples are obtained by sequentially and systematically scraping plaque from a number of teeth and the pH is determined after the pooled plaque is dispersed in a small amount of liquid. In a second method, glass or antimony microelectrodes are placed within plaque on the teeth at defined intervals following food ingestion. Such "touch electrode" methods allow direct readings of pH on the plaque surface. It has been emphasized[7] that both plaque sampling and utilization of touch electrodes are techniques which allow pH measurements only on accessible tooth surfaces and not at retentive sites in the dentition where carious lesions normally develop.

The third method used to monitor plaque pH involves the use of biotelemetry to allow measurements at caries-prone sites in the dentition. Small glass pH electrodes are fixed in the dentition so that their ion-sensitive end is positioned as a proximal tooth surface (**Figure 2**). Bacterial plaque is allowed to accumulate on the indwelling electrode so that after food ingestion the formation of acid by the interproximal plaque can be monitored by connecting the electrode with a small wire to a pH meter and recorder.

The advantages of telemetry are that the permeability characteristics of the plaque are maintained, it can be used to distinguish between food acids and acid from plaque metabolism, it allows continuous moni

Fig. 3. Symbol placed on food packages in Switzerland indicating that the product is safe for the teeth. Such products do not cause the interproximal plaque pH to fall below 5.7 for 30 minutes after ingestion.

toring of pH and accurate assessment of sequestering of acids, it measures pH at the sensing surface-plaque interface, and it allows studies with plaque which has been allowed to accumulate for long intervals.

The utilization of telemetry for monitoring plaque pH was pioneered by investigators in Switzerland.[8-11] Recent studies at the University of Minnesota[7,12-16] have provided supporting data for many of the original findings presented by the Swiss investigators. The status of work in Switzerland on the utilization of interproximal pH telemetry has recently been reviewed.[17,18] Legislation was passed by the Swiss Office of Health in 1969 which allowed the labeling of sweet confections as being "safe for teeth" if they did not depress the pH of plaque below 5.7 within 30 minutes after consumption. At this time approximately 90 sweet confectionery products have been tested and approved as being safe for the teeth.[18] In order to increase consumer awareness of these products a public relations campaign called "Aktion Zahnfreundlich" has been started in Switzerland and a registered emblem (**Figure 3**) is used to identify the safe products. Sales figures for the products have been rising with 50 per cent of the chewing gum market consisting of sugar-substituted products which are safe for the teeth. The significance of the development of nonacidogenic products will become more apparent when the functioning of fermentable carbohydrates and various foods in plaque acid production have been discussed.

Fermentable carbohydrates and acid production.

Interproximal pH monitoring has allowed an evaluation of the acidogenic potential of various carbohydrates. A great deal of data have been presented with glucose and sucrose which are readily fermented by plaque bacteria and consistently drive the pH to close to 4.0.[7] The results presented in **Table 1** indicate that other monosaccharides and disaccharides which are commonly found in the diet are readily fermented by plaque which has accumulated on an interproximal electrode. Solutions of the various sugars at concentrations as low as 0.1 and 0.01 per cent cause marked decreases in plaque pH.[19] It is clear that in addition to glucose and sucrose, fructose, galactose, lactose and maltose can contribute to the rapid formation of acid by dental plaque and that telemetry from interproximal sites provides an extremely sensitive technique for detecting fermentation of dietary carbohydrates by plaque.

TABLE 1

Minimum Interproximal Plaque pH Obtained by Telemetry Following Rinsing with Solutions of Various Carbohydrates

Concentration Tested (Percent W/V)	Minimum pH[a]					
	Sucrose	Glucose	Fructose	Maltose	Galactose	Lactose
0.01	5.62	5.65	5.80	5.99	6.48	6.41
0.10	5.33	5.25	5.35	5.67	6.40	5.92
1.00	4.80	4.79	4.76	4.98	5.39	5.49
10.0	4.10	4.12	4.12	4.15	4.30	4.06
20.0	4.06	4.07	4.03	4.09	4.16	4.11

[a]Values obtained from 30 min telemetry curves as described previously.[7]

In a series of studies with the starch, amylose, it was demonstrated that this polysaccharide can contribute to plaque acid production due to its degradation by the salivary enzyme amylase.[20] These type of data support previous studies from Switzerland[21] where interproximal telemetry was used to demonstrate that various starches and starch-containing foods can cause rapid and marked decreases in plaque pH. In a complex mixed diet starchy foods can significantly contribute to plaque acid production.

Based on the results of a large number of studies employing interproximal telemetry it appears that the total fermentable carbohydrate content of a food rather than just the level of one sugar such as sucrose must be considered when attempting to estimate its acidogenic and/or cariogenic potential.

Acidogenic potential of foods.

The production of significant quantities of plaque acid at interproximal sites in the dentition by low concentrations of essentially all of the carbohydrates found in the human diet provides an explanation for results obtained when a wide variety of foods were tested for their acidogenic potential. **Table 2** presents a listing of some of the foods which have been shown to cause the pH of interproximal plaque to fall below 5.5 within 30 min after ingestion.[22] All of the foods have concentrations of fermentable carbohydrate sufficient to allow rapid metabolism to acid by plaque bacteria and detection of the acid by the indwelling electrodes. This is not a surprising finding since most of these same foods have been shown to cause caries when fed to laboratory rats.[23-26]

In light of the marked acidogenic potential of many commonly eaten foods it would appear that the challenge to the teeth from the diet may be far greater than previously envisioned. There are very few foods which can be recommended as being safe for the human dentition.

Ranking of foods.

Since many foods have been shown to cause caries in rats and plaque acid production in humans, studies have been performed to evaluate whether foods could be ordered based on their cariogenic and/or acidogenic potential. In a series of studies with laboratory rats it has been demonstrated that foods can be ranked based on the formation of carious lesions.[26] In these studies the rats are provided with their essential nutrition through gastric intubation so that only the test foods come in contact with the teeth. The animals are housed in a programmable feeding machine so that the frequency and timing of food presentation can be carefully controlled. Using standardized conditions it was possible to use the carious lesions which developed in the rats to create a cariogenic potential index (CPI). The caries scores were compared to results obtained with sucrose (CPI = 1) and the foods were ranked as follows: chocolate cookie with soft filling (1.4); fortified cereal, 14 per cent sucrose (1.06); cereal, 8 per cent sucrose (0.96); presweetened cereal, 60 per cent sucrose (0.94); sugar-coated chocolate candy (0.91); potato chips (0.84); caramel (0.73); chocolate bar (0.72); unsweetened cereal, 2 per cent

TABLE 2

A Partial List of Foods Which Cause the pH of Human Interproximal Plaque pH to Fall Below 5.5 Within 30 Minutes After Ingestion

Apples, dried	Gelatin, flavored dessert
Apples, fresh	Grapes
Apple drink	Milk, whole
Apricots, dried	Milk, 2%
Bananas	Milk, chocolate
Beans, baked	Oatmeal, instant, cooked
Beans, green, canned	Oats, rolled
Bread, white	Oranges
Bread, whole wheat	Orange Juice
Caramel candy	Pasta
Carrots, cooked	Peanut butter
Cereals, nonpresweetened	Peas, canned
Cereals, presweetened	Potato, amylase
Chocolate, milk	Potato, boiled
Cola, beverage	Potato, chips
Cookies, vanilla, sugar	Raisins
Corn, flake	Rice, instant, cooked
Corn, starch	Sponge cake, cream filled
Crackers, soda	Tomato, fresh
Cream cheese	Wheat, flake
Doughnuts, plain	

sucrose (0.59); and starch (0.45). Although numerous questions can be raised with regard to the relationship of this animal model to disease development in humans it should be emphasized that this work demonstrates the range of foods which can contribute to caries formation and that there are detectable differences in various products.

In a study using interproximal telemetry it was demonstrated that foods may be ranked with regard to their acidogenic potential.[27] A series of standardized reference foods were fed to human subjects under carefully controlled conditions and the production of acid monitored for 120 min. As demonstrated in **Figure 4** all of the test foods except the aged Cheddar cheese and the skim milk caused the interproximal plaque pH to consistently drop to close to 4.0. The foods could clearly not be separated based on the minimum pH levels obtained. However, by calculating the area below pH 5.7 of the plaque pH response curves it was shown that the foods could be ranked from least to most acidogenic (**Table 3**). Since most of the foods cause the pH to drop to close to 4.0 the ordering of

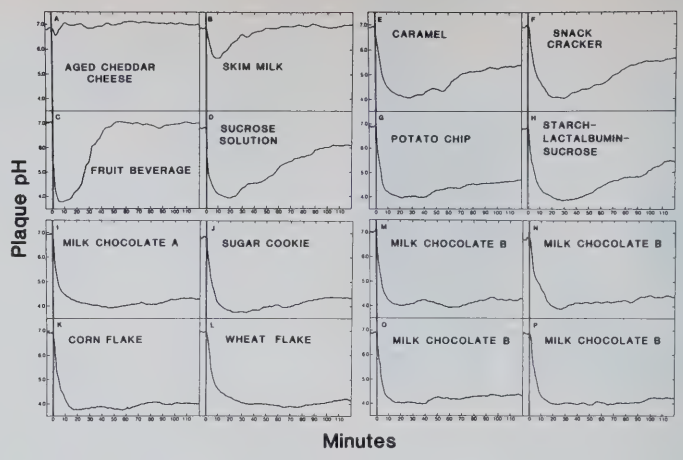

Fig. 4. Telemetry results obtained following ingestion of standard reference foods. A – L: results from one subject with each of the foods; M – P: results from 4 subjects with milk chocolate B.

the foods is based on the timing of the return of the various Stephan curves towards resting pH levels. The relationship of caries formation to oral clearance has been discussed by many dental scientists.[28-31]

Several important points can be made from the interproximal plaque pH ranking study. By using the techniques of plaque sampling and touch electrodes to monitor changes in plaque pH on accessible tooth surfaces it was suggested[32] that the acid attack on the teeth following eating lasted for approximately 20 minutes. As illustrated in **Figure 4** the acid produced from most of the foods lasted for a much longer interval with some of the products causing the pH to remain close to 4.0 for up to 120 minutes. Although the subjects being tested in the food ranking study were sitting quietly and there was consequently little physical stimulation of saliva flow there is no doubt that the presence of acid at caries-prone sites in the dentition can remain for far longer than 20 minutes. This phenomenon clearly warrants further investigation.

When the food ranking results are compared to the production of sulcal caries in rats fed some of the same test foods[25] reasonable agreement in the ordering of the foods is achieved.[27] In addition, the chemical composition of the standardized reference foods allows a comparison of the telemetry results to specific components found in the foods. **Figure 5** illustrates that the sucrose content of the various foods does

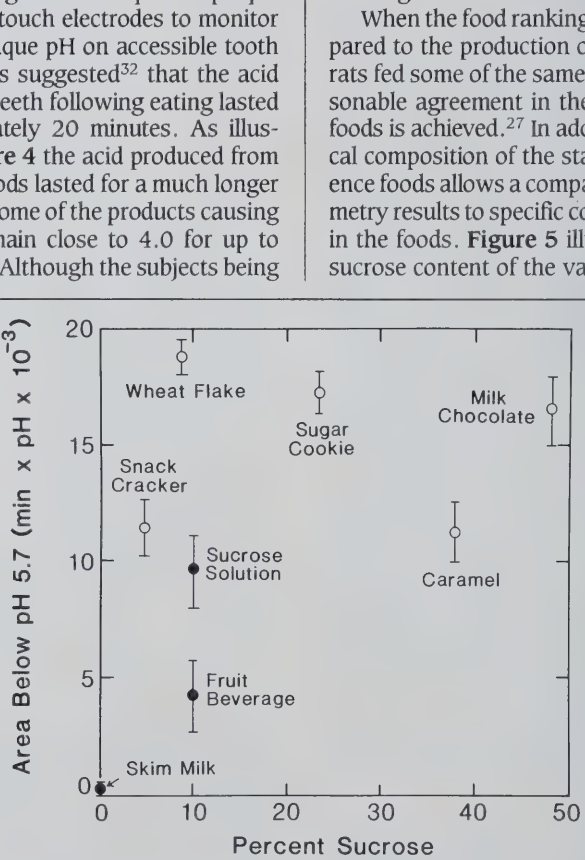

Fig. 5. Plot of area below pH 5.7 for each of the reference foods versus the percent sucrose in each product. Closed circles represent liquid products while the open circles represent solid foods.

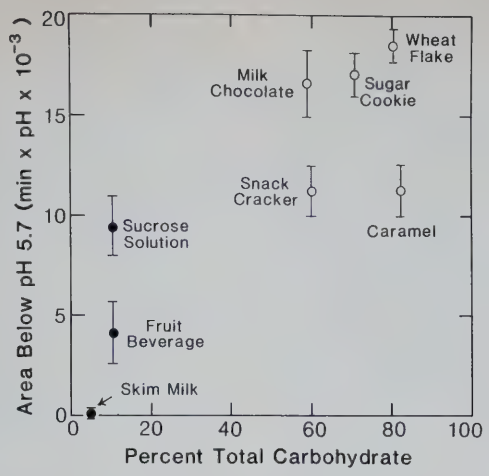

Fig. 6. Plot of area below pH 5.7 for each of the reference foods versus the percent total carbohydrate in each product.

not appear to be related to their acidogenic potential. **Figure 6** illustrates that the total fermentable carbohydrate content of the foods is also not a good means to assess *in situ* acidogenic potential. These findings are not really surprising in light of the many factors which can effect the response of plaque to a particular food.[7] It would be very difficult to estimate the acidogenic potential of a food based on its carbohydrate content due to the fact that the response could be significantly altered by the concentration and types of proteins and lipids present, the physical form of the food, the overall buffering capacity of the food, the acidity of the food itself, and, maybe most importantly, the presence of sialogogues which could stimulate saliva flow.

Based on the results which have been achieved using the rat caries and human plaque pH models it would appear that a food ranking system could be developed. Appropriate comparative studies would probably allow foods to be ordered based on their decay-producing potential. However, how such information might be used to produce benefits for oral health is not clear. Other factors which would need to be considered would include: the effect of mixing foods prior to and during ingestion; the sequence of eating different foods; the time of day when foods are eaten; the number of times a particular food would be eaten during a certain time interval, the effect of changes in food form; variations in the composition of a food; and ultimately, the effect of foods with decreased cariogenic potential on disease development in humans. Based on these types of considerations it would seem that screening foods for their cariogenic potential would not provide enough information to allow reasonable guidance for the concerned clinician, patient and consumer.

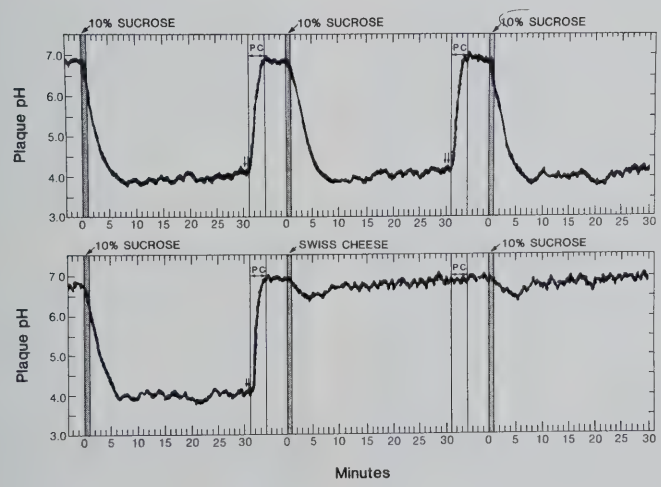

*Fig. 7. Effect of Swiss cheese on plaque acid production from sucrose. Upper panels illustrate the time-course of plaque acid changes following three consecutive sucrose rinses. PC represents chewing with laboratory wax which restores the pH to resting levels. Lower panels illustrate the effect of chewing five grams of Swiss cheese on plaque acid production (**Panel 2**) and the subsequent response following exposure to sucrose (**Panel 3**). The cheese prevents the expected drop in interproximal plaque pH.*

TABLE 3

Ordering of Foods Based on the Area Below pH 5.7 of Curves Obtained by Interproximal Telemetry with Reference Foods

Reference food	Area Below ph 5.7 (min × pH ± S.D.)
Aged Cheddar cheese	24.9 ± 30.6
Skim milk powder (10% W/V)	70.4 ± 131.9
Beverage, fruit (10% W/V)	3504.6 ± 1384.6
Sucrose (10% W/V)	7479.6 ± 1256.6
Caramel	8924.9 ± 1064.2
Snack cracker	9046.1 ± 1025.1
Potato chip	10885.1 ± 1829.5
Starch-lactalbumin-sucrose	11168.7 ± 475.7
Milk chocolate A	12930.0 ± 1269.4
Cookie, vanilla sugar type	13277.0 ± 519.0
Milk chocolate B	13332.4 ± 707.0
Corn flake	13759.8 ± 2314.8
Wheat flake (unfortified)	14743.1 ± 596.7

TABLE 4

Foods Which Do Not Cause the Interproximal Plaque pH to Fall to 5.5 Within 30 Minutes After Ingestion

Eggs	Meats
Cheeses	Ham
Blue	Nuts
Brie	Peanuts
Cheddar, aged	Walnuts
Gouda	Swiss Products*
Monterey Jack	
Mozzarella	
Swiss	
Chewing Gums	
Mannitol	
Sorbitol	
Xylitol	

*Approximately 90 sweet confectionary products formulated to be nonacidogenic in humans.

Nonacidogenic foods.

Since virtually all foods which contain fermentable carbohydrate cause the interproximal plaque pH to fall to close to 4.0 it is important to emphasize that there are a limited number of foods which do not cause marked decreases in plaque pH. Such foods were uncovered many years ago in Switzerland[9] and they include some types of nuts, a few varieties of meat, eggs and several cheeses (**Table 4**). Tests in other laboratories have confirmed these observations and work with cheese has demonstrated that there are at least seven cheeses[33] which do not cause acid to be produced when they are ingested (**Table 4**). Unfortunately, there are a limited number of naturally occurring foods which can be placed in the nonacidogenic category.

Anticariogenic foods.

The direct role of plaque acid in enamel demineralization has been well documented and it would seem reasonable that there might be foods which could interfere with this process. Indeed, it has been clearly demonstrated in laboratory rats that the feeding of certain cheeses can actually prevent the formation of caries even when the animals are on a diet rich in sucrose and/or starch.[34,35]

In a series of studies with carefully prepared and analyzed cheeses it was demonstrated that the inhibition of caries in the rat model may be due to an effect on acid production by plaque bacteria.[33] As illustrated in **Figure 7** the ingestion of Swiss cheese prior to exposure to a sucrose rinse caused a blockage of the expected drop in plaque pH due to plaque fermentation. Of the seven cheeses which were shown to be nonacidogenic (**Table 4**) it was demonstrated that three cheeses (aged Cheddar, Monterey Jack, Swiss) were capable of eliminating expected decreases in plaque pH while two others (Blue, Gouda) caused a partial alteration of the pH response to sucrose.[33] A variety of mechanisms have been suggested to explain these results[33] and it would appear to be important that the components in the cheeses which cause inhibition of plaque pH changes be isolated and characterized. Based on the anticaries effects in rats and the antacid effects in humans it would appear that certain cheeses provide a unique model for evaluating naturally occurring food components which can prevent decay. Information of this type might provide clues as to how other foods might be modified to decrease or eliminate their cariogenic potential.

Prevention of caries by dietary means.

There is little question that the ingestion of nonacidogenic foods would decrease the plaque acid attack on the teeth. Unfortunately, based on the complexity and fermentable carbohydrate content of the human diet it would appear unlikely that the ingestion of a few nonacidogenic foods would have a marked effect on the formation of dental caries. However, a series of recent studies have suggested that nonacidogenic products may actually be used to decrease the acidogenic challenge to the teeth and actually stimulate repair of enamel which has been altered by acid attack.

There are several important points which must be made in order to understand how caries might be reduced by dietary means. First, the ingestion of nonacidogenic snack foods between meals will stimulate the flow of saliva. It has been shown that the stimulated saliva can buffer the acids which have accumulated at retentive sites in the dentition. Indeed, the simple chewing of laboratory wax will rapidly return interproximal plaque pH to resting pH levels (**Figure 7**). Nonacidogenic foods such as peanuts and certain cheeses have similar effects.[36-38]

The second critical point is that the enhanced flow of saliva caused by the ingestion of the nonacidogenic product will stimulate remineralization of the enamel of the teeth. Remineralization of the teeth by dietary means has recently been demonstrated in a rat caries model system where a series of nonacidogenic sweeteners were used to stimulate saliva flow.[39] It was demonstrated that nonacidogenic sweet compounds were able to reverse the initial stages of dental caries produced in the molar fissures of rats by fermentable carbohydrate. There is a great deal of evidence that remineralization of teeth occurs spontaneously in the mouth[40,41] and that active measures can be taken to enhance its progress.[42,43] Indeed, enhancement of remineralization is now believed to be one of the primary anticaries activities caused by the presence of fluoride in the oral cavity.[43] Since stimulated saliva has been shown to be more effective for remineralization than unstimulated saliva it would appear that the between meal ingestion of nonacidogenic saliva-stimulating products could have a significant effect on the degree of remineralization which could occur in order to counteract the attack on the teeth from plaque acids.

The advantages of this approach to slowing caries formation are: (1) a natural tooth repair process will be used; (2) no modification of existing food products will be needed; and (3) there will be an incentive for the development of new snack products which will have a positive effect on oral health. Two things will need to occur to foster this approach to caries prevention. A caries clinical study will need to be performed to demonstrate that the ingestion of nonacidogenic snack foods between meals can actually reduce decay development and some type of recognition system for safe products must be decided upon. It would seem of great importance that appropriate individuals from government agencies, industry, professional dental organizations and academia get together and develop a reasonable set of criteria which can be used to evaluate potential noncariogenic and anticariogenic snack products.

CONCLUSIONS

A review of the literature with regard to dietary trends and food consumption patterns in the United States[44-49] indicates that foods containing a wide range of fermentable carbohydrates will continue to be a significant and important part of the typical diet. Although there may be some alterations in the quantities of simple sugars and/or complex carbohydrates which are consumed (i.e., decrease in sucrose with an increase in fructose) the data summarized in this communication emphasize that such changes would probably not alter the cariogenic challenge to the teeth from the diet. The observations that essentially all of the carbohydrates in the diet can dramatically contribute to plaque acid production (**Table 1**), that most foods that are ingested contain sufficient quantities of carbohydrate to drive the interproximal plaque pH to close to 4.0 (**Table 2**), and that the pH can remain at low levels for prolonged intervals at interproximal sites following ingestion of solid foods (**Figure 4**) emphasize the magnitude of the potential that the diet has for damaging the teeth.

Thus, it appears that the Switzerland model represents the most reasonable approach to preventing caries by diet modification. The diet of the future can be made less cariogenic by developing sweet nonacidogenic snacks which when ingested between meals will cause neutralization of plaque acid and foster enamel remineralization via the stimulation of saliva flow.

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CAN MICROBIOLOGICAL KNOWLEDGE BE APPLIED IN DENTAL PRACTICE FOR THE TREATMENT AND PREVENTION OF DENTAL CARIES.

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INTRODUCTION

Some microorganisms are of greater importance than others in the pathogenesis of dental caries namely Streptococcus mutans *and* lactobacilli. *I have tried to illustrate this fact in* **Fig. 1**.

INTRODUCTION

Certains micro-organismes sont plus importants que d'autres dans la pathogénie des caries dentaires, surtout le streptococcus mutans *et le* lactobacillus. *J'ai tenté d'illustrer ce fait dans le* **tableau I**.

The figure shows the acid production of different microorganisms in the plaque. Some of the bacteria might produce alkali (1a), others only slight amounts of acid (1b). Other microorganisms comprise a large proportion of the plaque bacteria which although they produce large amounts of acid never cause the pH to reach the so called critical level. The "critical pH" is the level at which tooth substance is dissolved to a considerable degree and this level is believed to be between pH 5.3 and 5.7. Some microorganisms for example *S. mutans*[3] and *lactobacilli*[4] show optimal growth at a lower pH than other plaque bacteria and reach a final pH past the "critical" level. Having examined **Fig. 1** it will be evident that it is not the *number* but the *type* of microorganisms which determine whether demineralization will occur or not. Thus, in order to evaluate the caries risk the plaque index of a patient is of limited value. In fact, in two studies on school children we did not find any correlation at all between the amount of plaque and the incidence of dental caries[1,2]. Consequently it has to be resolved to what extent a person is carrying caries inducing microorganisms such as *S. mutans* and lactobacilli.

METHODS

For determination of the level of *S. mutans* and lactobacillus infection, it is most convenient to use a saliva sample. We generally use paraffin stimulated saliva. The patient is asked to chew on a piece of paraffin wax for a few seconds. The saliva obtained during this time is not collected but swallowed as it often contains food remnants. Thereafter the patient chews on the paraffin using both sides of the mouth. The saliva is expectorated via a funnel into a measuring cylinder. From this the required amount is transferred to a transport vial using a pippette or a syringe. The cap of the transport vial is then securely tightened, the vial turned upside down in order to mix the transport fluid and the saliva. Material for sampling can be obtained from a microbiological service laboratory when *S. mutans* and lactobacilli routinely are cultivated in Canada, for example from the Department of Oral Biology at the University of British Columbia. The sample is sent to a microbiological laboratory for analysis (**Fig. 2**). At the laboratory the sample is homogenized, diluted and cultivated on selective media[3]. The number of *S. mutans* and lactobacilli per ml saliva is calculated and in the Swedish population $> 10^6$ *S. mutans* respectively $> 10^5$ lactobacilli are considered as high values.

APPLICATION IN GROUPS OF PERSONS

We have tried to utilize microbiological examinations for selection of children at a high caries risk. In one of our studies we informed children with a high lactobacillus count about the relationship between these bacteria and the incidence of dental caries. The children were instructed to reduce their between meal eating of sweets. They were then examined every second month and when the lactobacillus count had dropped, the children were praised. If the count had increased or remained the same, the children were stimulated to try to improve the dietary habits. Over a period of 15 months the number of children with a low lactobacillus count gradually increased and this resulted in considerable caries reduction. The children with originally high lactobacillus counts in the test school which were given dietary counseling received on the average 3.3 fillings per child. The corresponding figure among the children in the control school was 8.2[4].

In another study we used *S. mutans* as a basis for selection[5]. In one of the groups children with high counts of *S. mutans* received a preventive program mainly based on professional tooth cleaning twice a month. The children in this group developed 0.34 new carious lesions as compared to 2.5 in the control group which only received the regular semi-monthly fluoride rinse in the school dental service. In both studies the children with low counts of lactobacilli and *S. mutans* respectively showed a significantly lower incidence of caries than those with high counts. (**Fig. 3**)

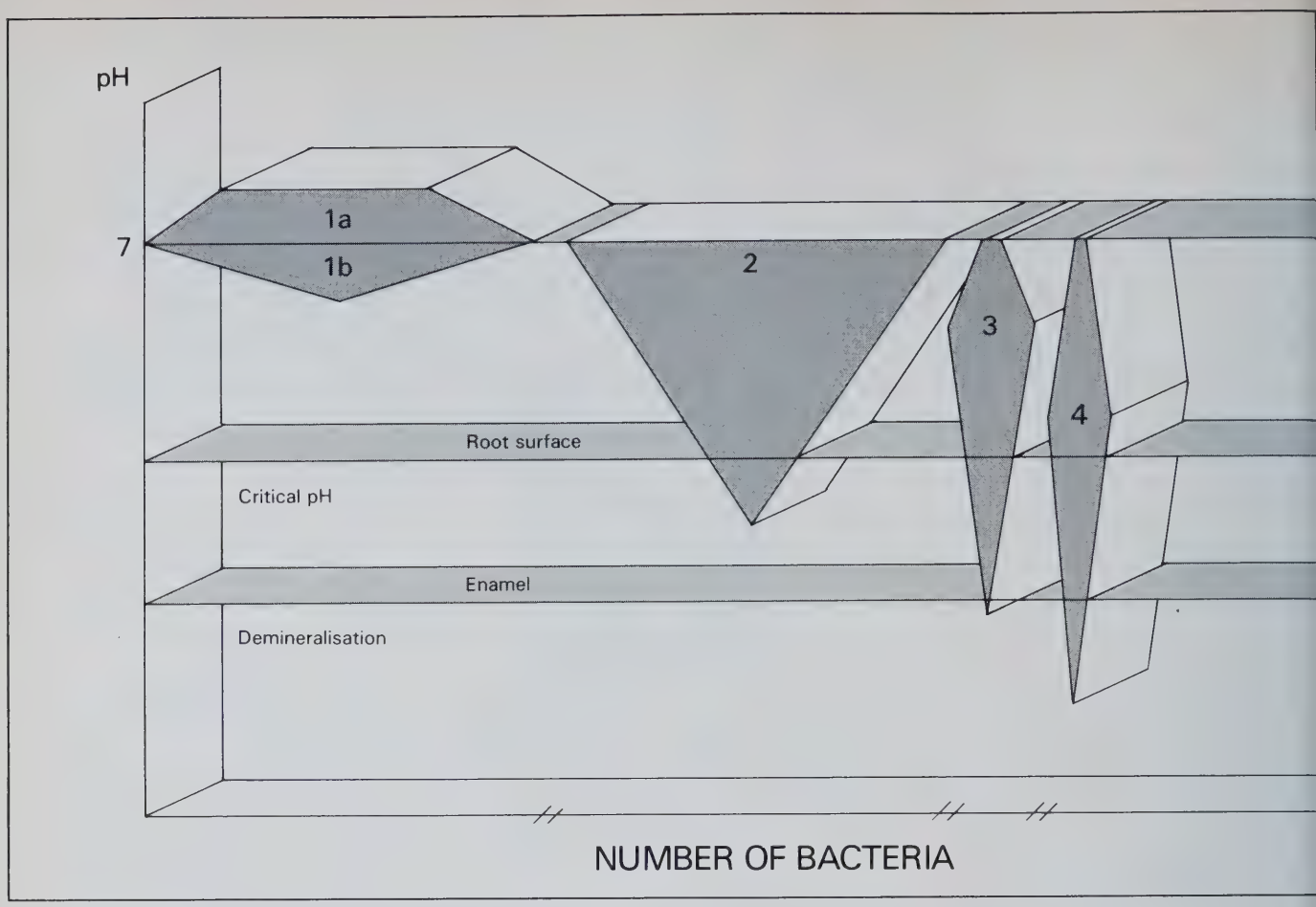

Fig. 1. *Acid production of different microorganisms in the plaque. (See text).*

Professional tooth cleaning is expensive and does not significantly reduce the number of *S. mutans* in saliva and plaque material[6]. We have therefore tried another approach in order to eliminate or reduce the *S. mutans* infection. It is based on the fact that *S. mutans* is very sensitive to chlorhexidine[7]. Children with a high number of *S. mutans* were treated with a 1 per cent chlorhexidine gel in custom fitted vinyl applicators. The effect of the treatment was controlled by a new microbial analysis. The treatment was repeated three times per year and at each occasion, only the children with high numbers of *S. mutans* were treated. Both the test and the control group followed conventional preventive measures used in the Swedish school dental service. The test group developed significantly less caries than the control group during the three year study period (4.2 versus 9.6). A real dramatic difference was found between the children who had a very large number of *S. mutans* at the start of the study. In the control group these children developed about 20 new carious lesions as an average (**Fig. 2**) In the test group, the corresponding figure was less than 4[8]. The data from this study clearly show that the level and, duration of the *S. mutans* infection are strongly correlated to the incidence of caries in Swedish teen agers[9].

The findings from the studies described above thus show that microbiological examinations can be used for selection of children at a high risk to caries attack. When the effect of preventive measures is controlled by microbiological methods a considerable reduction of the caries incidence can be achieved. An important question is whether these methods can be applied in general practice.

Fig. 2. *Illustration of how a paraffin stimulated saliva sample can be used for determination of secretion rate, buffer capacity and microbiological analysis.*

Saliva sample		
Paraffin stimulated saliva		To transport vial for S. mutans and lactobacilli
	1 ml	
	1 ml	for buffer capacity
secretion rate (ml/min)		

APPLICATION IN INDIVIDUAL PATIENTS

In the individual case the prerequisite for an adequate treatment is a correct diagnosis. The diagnosis of dental caries should – just as the diagnosis of any other disease – be based on history, state, and if necessary, laboratory examinations. Neither the case history nor the clinical examination is completely objective. It might therefore be difficult to assess the actual caries risk on these examinations alone and in such situations, microbiological examinations can be of value. If these indicate that the caries risk is high, because of high numbers of *S. mutans* and lactobacilli, measures have to be taken. In most cases we try to eliminate or reduce the number of cariogenic microorganisms by dietary measures. We take a dietary history and on the basis of this we recommend certain changes. The goal is to starve the acid producing microorganisms by a reduced intake of sugar and refined carbohydrates. In highly motivated persons a clear cut reduction of the number of *S. mutans* and lactobacilli is achieved in two persons out of three[10]. In patients where the dietary measures do not give satisfactory results antimicrobial measures have to be

Fig. 3. Effect of caries preventive measures in persons with high numbers of lactobacilli or S. mutans

	High numbers of:		
Group	Lacto-bacilli	S. mutans	S. mutans
Test	3.3[1])	0.3[2])	3.9[3])
Control	8.2	2.5	20.8

1) No. of new fillings. Preventive measure: dietary counseling (4).

2) No. of new carious lesions first year. Preventive measure: professional tooth cleaning twice a month (5).

3) No. of new carious lesions during a three-year period. Preventive measure: chlorhexidine gel treatment (8).

used. As mentioned above, chlorhexidine has a certain advantage when trying to reduce the *S. mutans* infection. Treatment with a 1 per cent chlorhexidine gel 5 minutes per day for 2 weeks generally results in a considerable reduction of the number of *S. mutans* in plaque and saliva for a period of 3-4 months[11]. Stannous fluoride applied either topically or as a mouth rinse can also give a dramatic reduction in the *S. mutans* count[12]. The application of the principles described above are illustrated in two actual patient cases. The first case was a woman, 65 years old, house wife, referred from a private dental practitioner to our university clinic because of recurrent caries problems. She presented both enamel and root surface carious lesions and the practitioner asked for assessment of the caries risk before he started extensive crown and bridge restorations. The salivary secretion rate and the salivary buffer capacity were normal, but the numbers of *S. mutans* and lactobacilli were high. The dietary history revealed a high sucrose intake. The patient sometimes had candies in bed while reading detective stories. The effect of various measures on the microflora is shown in **Fig. 4**.

In this case the initial dietary counseling did not have the desired effect on lactobacillus count. After new counseling the number dropped, the caries risk was considered low and extensive restorative treatment started. The level of infection remained low during the autumn but in January a high number of *S. mutans* was found in the saliva sample. When questioned, the patient told that she had received both books and candy boxes for Christmas. The patient was informed about the result of the microbiological examination but obtained no other treatment and one month later the number of *S. mutans* was again low. The destruction of the bridgework by secondary caries might in this case have been prevented by use of microbiological examinations.

The second case was a 28-year-old male student recently married. He had 62 DMFS, chalky enamel caries, some large dentinal carious lesions, pulpitis in three teeth and slight gingivitis. The dietary history showed a well balanced diet with a low sucrose intake. The salivary secretion rate and buffer capacity were normal and the result of the microbiological examinations were as follows:

S. mutans 10.000 per ml saliva
Lactobacilli 15.000 per ml saliva

In this case the low numbers of *S. mutans* and did not agree with the clinical picture but supported the statement that the sucrose consumption was low. A searching interview revealed frequent intake of sweets and soft drinks some years earlier. The cavities which probably had developed during this period were restored. At the clinical examination after one and two years no new carious lesions were recorded. Both the dentist and the patient saved time and costs of caries preventive measures.

DISCUSSION

The fact that some microorganisms are cariogenic while others are not is very important. The use of this knowledge has practical advantages. Persons at high risk can be identified before a number of carious lesions have developed. The effectiveness of caries preventive measures can be objectively assessed. A patient can be informed about a positive result of dietary changes within a month. Information about the clinical effect – a reduced caries incidence – will take a year.

It is extremely important that the effectiveness of various therapeutic and preventive measures on the cariogenic microorganisms is controlled by objective tests. To run a caries preventive program based on dietary counseling without using microbiological methods is like running a weight reduction program without using a scale.

In Sweden the Social Board has taken a definite stand and supports the use of the microbiological methods described in this article. In a guideline for dental health care in adults the Board recommends that salivary and microbiological should be used whenever a high caries risk might be expected and whenever extensive restorative treatment is being planned. The authorities consider the use of these methods so important that the patients are refunded 50 per cent of the costs by the Governmental Insurance Company. At the Department of Oral Microbiology in Göteborg around 27,000 samples were examined during 1982. Partly this figure can be explained by the fact that it has to be shown by objective data that the actual caries risk is low before an extensive treatment plan is approved by the insurance dentist. The main reason, however, seems to be that the clinical work becomes more interesting and more meaningful both for the dentist and the patients.

On the question if microbiological knowledge can be applied in dental practice for the treatment and prevention of dental caries, my answer is yes – without a shadow of a doubt.

Fig. 4. Effect of various preventive measures on **S. mutans** *and lactobacilli in case 1.*

Month	No. per ml saliva	
	S. mutans	Lactobacilli
May 81	3.2×10^6	4.1×10^6
	MEASURES: Dietary counseling, chlorhexidine gel.	
June	< 100	2.5×10^6
	New dietary counseling.	
July	45×10^3	75×10^3
	Low values. Restorative treatment.	
Oct	102×10^3	60×10^3
Jan 82	$1{,}2 \times 10^6$	45×10^3
	MEASURES: The patient informed per telephone about the high number of *S.mutans*. No other treatment.	
Febr	50×10^3	25×10^3

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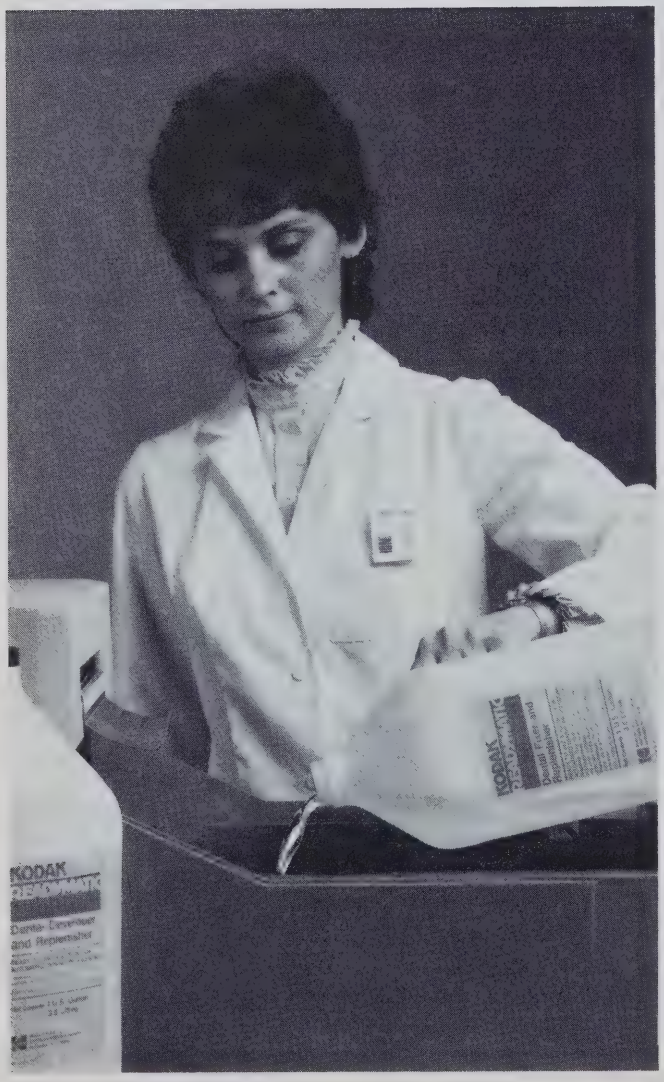

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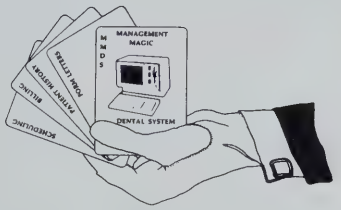

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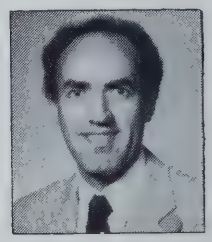

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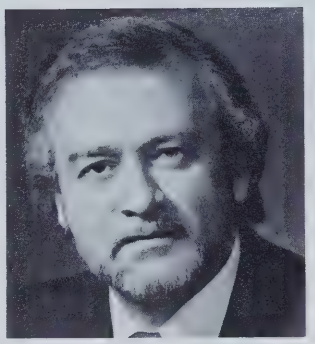
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FUTURE IMPACT OF PUBLIC HEALTH AND PREVENTIVE METHODS ON THE INCIDENCE OF DENTAL CARIES

Harry M. Bohannan, DMD, MSD
Dalton McMichael Fellow and Research Professor, School of Dentistry, University of North Carolina, Chapel Hill, North Carolina.
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ABSTRACT

A number of recent studies have documented a precipitous decline in dental caries during the past 10 years. Not only has caries prevalence declined, but the number of caries free children has increased, and the pattern of decay has changed. The extent to which current public health and prevention methods are directly responsible for the observed decline, or will be responsible for further change, is open to speculation. Undoubtedly, however, the changing pattern of dental caries will result in altered preventive practices, and additional benefits in the future. Preventive programs will be targeted more directly to the predominate lesion of the day – pit and fissure caries. Consequently, increased use of occlusal sealants will constitute an important technological change in preventive dental practice. A realistic appraisal of the costs and relative effectiveness of individual preventive procedures will also result in preventive practices being tailored to the direct needs of the individual patient in private practice, and targeted to high risk groups in public programs. The ultimate goal of prevention is to eliminate disease. The realization of that goal in dentistry will be dependent upon further research and the application of new information by the practicing profession.

SOMMAIRE

Certaines études effectuées récemment démontrent qu'au cours des dix dernières années, le nombre des caries a diminué de façon spectaculaire. Non seulement leur prévalence a-t-elle diminué, mais aussi le nombre des enfants ne présentant aucune carie a-t-il augmenté. De plus, les caries ont tendance à se présenter différemment. Cependant, on peut encore faire des conjectures et se demander jusqu'à quel point les méthodes de prévention et les mesures d'hygiène publique actuelles sont la cause directe de la réduction des caries ou jusqu'à quel point elles le seront à l'avenir. Ce qui est sûr, toutefois, les caries, parce qu'elles se présentent différemment, susciteront d'autres habitudes préventives et d'autres avantages. Les programmes de prévention viseront plutôt les problèmes de l'heure, soit les caries des puits et des fissures. En conséquence, on aura davantage recours à des matériaux de scellement occlusaux, ce qui constituera un changement technologique important dans la prévention dentaire. Une évaluation réaliste des coûts et une efficacité relative de chacune des procédures préventives entraîneront également des habitudes de prévention qui, dans les cabinets privés, répondront aux besoins précis de chaque patient et qui, dans les programmes publics, viseront les groupes présentant des risques élevés. Le but ultime de la prévention est d'éliminer la maladie. Pour atteindre ce but en dentisterie, tout dépendra des recherches qu'on fera à l'avenir et de la mise en pratique des connaissances acquises par les praticiens dentaires.

INTRODUCTION

Consideration of the impact of public health and office-based preventive methods on the incidence of dental caries in the future requires some historical perspective, knowledge of current disease status, and speculation on probable and possible changes in preventive methods. Fortunately, epidemiologic data are available that document the prevalence of dental caries at various times throughout much of the world. In recent years dental prevalence data have provided an accurate assessment of the current status of dental caries in most Western countries. Unfortunately, however, considerations from that point forward become highly speculative, particularly because we are not entirely sure of the reasons for recently observed changes in dental caries. This paper will review the current status of dental caries, comment on the possible factors responsible for that status, and project future changes in both private and public preventive programs and the disease they address.

DISCUSSION

Dental Caries today

Since 1978 a growing number of reports in the dental literature have documented a dramatic decline in dental caries in the industrialized western world,[1-12] and particularly in the United States.[13-21] These studies provide overwhelming evidence that the decline ranges from 30 to 50 per cent among children and adolescents. The data also indicate that, while the decline may have been gradual over the years, much of it occurred in the past decade. With the decline in caries prevalence has been a concommitant increase in the percentage of caries free children. For example, comparison of data from the 1971-74 Health and Nutrition Examination Survey[22] and the 1979-80 National Caries Prevalence Survey in the United States indicated an increase of 9 per cent in caries free children ages 5-17.[17-19] A similar experience has been reported in other countries.

Perhaps a factor of equal significance to the future of prevention is the marked decline in smooth surface lesions, to the

TABLE I

Percent of Tooth Surfaces Attacked by Caries 1935-40*

PERCENT OF CARIOUS SURFACES						
Age	Occlusal	Mesial	Distal	Buccal	Lingual	No. surfaces at risk
6-7 yrs.	43%	17%	14%	13%	12%	28
12-14 yrs.	57%	16%	11%	7%	10%	128

* from Spolsky, V.W., Epidemiology of Dental Caries: The Impact of Sealants, in Viewpoints on Preventive Dentistry, The Role of Pit and Fissure Sealants, Johnson and Johnson Company, Woodridge, Medical Dynamics, 1978. Original data from:

1. Knutson, J.; Klein, H.; and Palmer, C., Dental Needs of Grade School Children of Hagerstown, Maryland, *JADA* 27:579, 1940.
2. Marshall-Day, C., Sedwick, H., Studies on The Incidence of Dental Caries, *Dent. Cosmos.* 77:442,1935.

TABLE 2

PERCENT DENTAL CARIES BY SURFACE			
SURFACE	1935 and 1940*	NCHS** 1971-73	NIDR*** 1979-80
OCCLUSAL	50	49	54
BUCCAL-LINGUAL	21	27	30
MESIAL-DISTAL	29	24	16

* Percentages based on two frequently cited studies of 6-7 and 12-14 year old children as cited by Spolsky (see Table 1)

** Percentages based on children 5-17 in the National Center for Health Statistics' Health and Nutritional Evaluation Survey, 1971-73.

*** Percentages based on children 5-17 in the National Institute for Dental Research's National Dental Caries Prevalence Survey, 1979-80.

TABLE 3

Percent Dental Caries by Surface Fluoridated and Fluoride Deficient Populations National Preventive Dentistry Demonstration Program* 1977-78

SURFACE	FLUORIDATED COMMUNITIES	FLUORIDE DEFICIENT COMMUNITIES
OCCLUSAL	54	54
BUCCAL-LINGUAL	40	35
MESIAL-DISTAL	6	11

* Data from Bell, R.M., Klein, S.P., Bohannan, H.M., Graves, R.C., and Disney, J.A.: National Preventive Dentistry Demonstration Program Baseline Report. *R-2862-RWJ*. The Rand Corporation, Santa Monica, California, 1982.

point that dental caries has become predominately a pit and fissure disease. Early caries prevalence studies showed that smooth surface lesions constituted 27 per cent to 31 per cent of the total caries experience respectively in the 12-14 and 6-7 year old children (**Table 1**).[23,24] More recent studies have traced a progressive decline of approximately 50 per cent in the proportion of these interproximal lesions (**Table 2**).[17,19,25] The National Dental Caries Prevalence Survey[17,19] revealed that only 16 per cent of the caries experience of 5-17 year old children occurred in interproximal surfaces, while 84 per cent involved pit and fissure surfaces.

Another important aspect of this change is the similarity of disease patterns in fluoridated and fluoride deficient populations. Clinical examination baseline data from the National Preventive Dentistry Demonstration Program,[25] a four-year longitudinal study of over 9,500 children in ten geographically divergent cities, show remarkably little difference in the *percentage* of carious lesions by surface between fluoridated and fluoride deficient sites (**Table 3**). While the caries incidence as 35 per cent lower in fluoridated sites, pit and fissure lesions (occlusal, buccal, and lingual) constituted 94 per cent and 89 per cent of all lesions recorded for children 6-13 years old in fluoridated and fluoride deficient communities respectively.

Most of the available epidemiologic data relate to children and adolescents. The lack of comparable data for young adults raises the question of whether the decrease in prevalence represents a permanent reduction or merely a delay in onset. Even without comparable data it seems reasonably safe to take the position that a decrease in dental caries in children will not be offset by a subsequent increase in adulthood. Dental caries is a disease of the young, and the studies that include an assessment of adults indicate that once adolescence has been negotiated there is relatively little *new* caries on *previously unaffected* coronal surfaces. Thus, if recurrent caries associated with restorations is avoided by maintaining sound tooth surfaces into adulthood, it is probable that caries incidence in later years will, in fact, decline.

Obviously, one must address the subject of root caries in considering dental caries in adults and the future impact of preventive programs. Once again, relatively few data are available. Katz[26] found only 12 reports on root caries published between 1949 and 1981. Much of the recent data reflect the work of Stamm and Banting,[27,28] and Banting and co-workers in Canada.[29,30]

In considering the future, many take the position that the growth in the number of older people will translate into more carious root surfaces. While that conclusion is probably valid, the prevalence of root surface caries is apparently quite low. Katz estimated that about 40 to 50 per cent of patients have one root surface lesion, and, in populations over 50 years old, that about 1 of 5 teeth *with recession* would experience root caries. Interestingly, this review of the literature failed to reveal an association between root caries and oral hygiene scores.[26]

Factors influencing Caries decline

It is of much interest that the decline in dental caries has been observed in both fluoridated and fluoride deficient areas of the world. Further, the decline seems to have occurred despite differences in cultures, customs, climates, and foodstuffs, the presence or absence of organized preventive programs, differences in socioeconomic status, and variations in dental care delivery systems. The change in the prevalence, incidence, and pattern of dental caries has raised questions regarding the reasons for the change and the future directions for prevention in dental practice and in public health programs.

In speculating on the future impact of public health and prevention methods on the incidence of dental caries, we are handicapped by our incomplete understanding of the exact causes for the recent decline in caries. The ubiquitous nature of fluoride in today's environment is generally accepted as the single most important factor influencing the decline. The widespread adoption of water fluoridation and the consequent incorporation of therapeutic levels of fluoride into prepared foodstuffs and bottled drinks, coupled with the almost universal use of fluoridated dentifrices, has resulted in important contributions to improved oral health. Organized public health programs

TABLE 4

ANTIBIOTIC SALES*			
Type	1970[1]	1980[2]	Percent change
Oral	359,407	611,173	70%
Injectable	147,034	530,809	261%
Total**	539,612	1,443,925	119%

* expressed in 1000s
** topical included
1. U.S. Pharmaceutical Marketing, Drug Stores and Hospitals, IMS, America Ltd, 1970
2. U.S. Pharmaceutical Marketing, Drug Stores and Hospitals, IMS, America Ltd, 1980

have promoted fluoride rinses for the school-based population and the use of school water fluoridation or fluoride tablets in fluoride deficient areas. Pediatricians now prescribe vitamins containing fluoride routinely.

The generalized improvement in education and socioeconomic status of the Western population is another important factor contributing to improved health practices. People are generally more health conscious. They seek and receive more health services, including preventive procedures, and dietary patterns have changed for the better.

All of these factors are important, yet one cannot ignore the possibility that other influential factors have not been identified. For example, people are living longer,[31,32] and there is a generalized increase in height[33] and weight.[33,34] It would not seem unreasonable to find that some of the factors contributing to increased longevity and physical change also affect the health of the teeth and their supporting structures.

Since caries has been identified as an infectious disease, and since S. mutans is considered an important etiologic agent, it is also reasonable to believe that any drug affecting streptococci might lead to a decline in caries. For that reason, the growth in the use of antibiotics should be explored carefully as a potential contributor to the generalized decline in caries prevalence. The fact that previous studies have reported reduced caries incidence in children receiving regular low doses of penicillin for the prevention of recurrent rheumatic fever[35] may be indicative of broader changes related to increased antibiotic use over the past decade[36,37] (**Table 4**).

Future impact of prevention

The effects of private and public program efforts to reduce further the incidence of dental caries depends to a great extent on the nature of the programs that will operate in the future. In turn, the existence of a program will depend on its cost effectiveness as viewed by those who support it. Thus, predictions, which are chancy at best, given our lack of complete understanding of current changes in the incidence of caries, must also factor in the likelihood of continued support for public programs, and the profession's attitudes toward change for private, or office-based preventive methods.

Water Fluoridation

Water fluoridation currently is the first line of defence against dental caries. All studies show less dental caries in fluoridated areas than in fluoride deficient areas. Communal water fluoridation has been proven safe beyond any doubt, and is the single most cost-effective caries preventive procedure available today. The ubiquitous nature of fluoride in today's environment, however, has reduced the potential benefit from the historically expected 50 to 60 per cent to about 35 per cent.[25] Nonetheless, even with the decline in dental caries attributable to fluorides from other sources, at approximately fifty cents per year per person (U.S.), water fluoridation remains prevention's best buy.

Yet, there is reason for concern over anticipated future reductions in caries incidence from fluoridated water, because active support for fluoridation seems to be diminishing. In the U.S., appropriations for fluoridation related activities at the Centers for Disease Control are in doubt at this time, a time when only 50 per cent of the U.S. population is served by fluoridated water supplies.[38] The easy targets of water fluoridation, large cities, are gone; only San Diego, Los Angeles, Phoenix, Tucson, and San Antonio remain as major unfluoridated metropolitan centers. Increasing access to fluoridated water will cost more in the future, while benefits will be reduced. Increased activism on the part of the nation's dental practitioners, to whom so much past success is credited, will be necessary to garner public funds for increasingly less cost effective fluoridation projects. Whether this activism will occur in the face of effects felt by practitioners from the current decline in caries is speculative.

To the extent that current levels of fluoridation are maintained, it is fair to predict that fluoridation will continue to exert a major effect on the incidence of caries, perhaps a continuation in its decline. To expect additional substantial effects from expanded "coverage" is perhaps less realistic.

Self Applied Topical Fluorides

The potential for self-applied fluorides to effect further decline in dental caries appears somewhat limited. Fluorides are most effective in preventing smooth surface lesions but the predominate lesion is pit and fissure caries. Fluoridated dentifrices now represent about 90 per cent of all toothpaste sales in the U.S., and apparently have become a daily substitute for other self or professionally applied fluorides. The cost effectiveness of these other methods for topical application, particularly fluoride rinse programs, is in some doubt. Per person costs for these programs vary widely[36,39] and, at best, reductions of less than a surface can be expected over two or more program years.[25,38,40] A rationale for the continuation of publicly-supported, mass-rinsing programs will be increasingly difficult to formulate in the face of the changing nature of caries, the alternative uses available for public funds, and the less than substantial benefits derived.

Most likely, these programs will not be completely abandoned, but their nature should, and eventually will change. For example, the use of fluoride supplements in fluoride deficient areas should be encouraged, particularily during tooth development years and immediately following eruption. Also, self-applied fluorides should be an important part of targeted programs for high risk children. While the large increases in caries-free children raises the question as to the advisability of advocating routine use of fluoride rinses for all children, especially in fluoridated communities, children who demonstrate high caries susceptibility regardless of fluoridation status should receive fluoride exposure well beyond the routine public health procedures and schedules used today.

Professionally Applied Fluorides

Current practice dictates that all children, and many adults, receive topically applied fluorides during routine recall visits in dentists' offices. the effect of these treatments in the current environment of decline in caries prevalence is unknown, as is the treatments' contribution to the decline. In all probability, the routine application of such procedures is unnecessary. Such a routine overtreats some children and undertreats others. In-office fluoride application should be based on individual diagnoses reflecting the patients' age, previous caries experience, existing disease, oral cleanliness, eruption schedule and teeth at risk. In all likelihood, however, routine treatments will continue for some time. Not only do patients expect the procedure, but also such treatments represent a significant proportion of practitioners' services and gross billings.[41] Nevertheless, the effects of such treatment can be expected to be minimal on the overall incidence of caries, due both to less than universal utilization of dentists' services and the relatively minor preventive effects attributable to such treatments.

Occlusal Sealants

As the 1940's can be considered the decade of water fluoridation, the 1980's seem destined to become the decade of sealants. The efficiency and safety of sealants have been proven in numerous studies.[42] The recognition that today's carious lesion is predominately one of pits and fissures requires an altered approach to prevention. Fluorides provide maximum protection to smooth surfaces; sealants were developed to supplement fluorides in the protection of fissured surfaces.

The results of the National Preventive Dentistry Demonstration Program[25] showed sealants to be the single most effective procedure of all used in that study. One can expect increased emphasis on the use of sealants in years to come. In fact, the demonstrated change in the pattern of dental caries suggests that sealants will replace other preventive procedures as the principal method used to reduce caries incidence in public health programs and in private practice.

However, it may require the entire decade before this change in emphasis gains momentum. No less than three national conferences[43-45] have been held in the past 30 months promoting the use of sealants, all of which were held to some extent because of a recognition of the underutilization of sealants by practitioners. Sealants were introduced to the profession before they were perfected and without a thorough explanation of the requirements of a demanding technique. Early experiences were unsatisfactory and sealants have not been accepted by the practicing profession. Dentists cling to beliefs of the past and continue to accept the amalgam filling despite its demonstrated deficiencies. As a result, the anticipated effects of sealants, the virtual elimination of pit and fissure decay in regularly treated children, will only begin to be seen in this decade.

Other Approaches

The preceding review has focused on existing preventive approaches, attempting to predict their use and impact in the near future. In addition to these preventive methods, other approaches are currently under development. Some of these approaches are refinements of existing methods, while others represent the exploration of completely different paths to the reduction of caries. What all of these approaches have in common is their (presently) unknown effect. What all of the approaches must have to become a useful part of public and/or private preventive programs is the ability to replace existing methods at lower cost, to supplement existing methods with relatively high effectiveness in reduction of the generally small increments of decay now existing across the population, or to serve as specific treatments in high risk individuals for whom current methods represent minimal preventive effect.

A complete review of these developing approaches is beyond the scope of this discussion, but a few observations may suggest the outline of things to come. For example, reduction in caries through current preventive methods may be reaching a plateau. Yet, these effects are obtained in the absence of good compliance by both patients and practitioners with many known preventive actions. Further improvements in existing prevention programs can be expected if greater attention is paid to behavior modification intended to increase compliance with known preventive procedures. Another approach that will increase the effectiveness of existing methods is the development of slow release mechanisms for topical fluorides. Perhaps the greatest benefit of this approach will be seen in handicapped persons and those identified as at high risk to caries. In the same vein, developments of improved bonding methods, to both enamel and dentin, will undoubtedly increase practitioner acceptance of sealants for both undecayed and minimally decayed surfaces.

In terms of new pathways to prevention, the approaches currently under development illustrate both the impossibility of predicting eventual effects and the potential for truly startling change in the effects of prevention on caries incidence. Plaque inhibiting dentrifices and mouthwashes are now being marketed in the U.S., and have been available in Europe for some time. To date, their effectiveness has been the matter of some debate, particularly with respect to caries. Yet their active ingredients unquestionably have a plaque reducing effect. What the eventual impact of the widespread use of such products will be is unknown, but if they become as common as fluoride containing oral health products, it is only reasonable to expect some beneficial effects on caries incidence. While this effect must be quantitatively small – there being fewer decayed surfaces to prevent – the cost effectiveness of these products will be excellent. Another approach, mouthrinses designed to promote remineralization of incipient lesions offer both the same uncertainty and potential. The third approach is the development of a caries vaccine. That such a vaccine will eventually become available is almost a certainty. In fact, the Burroughs Wellcome Company will begin testing an injectable vaccine in England in early 1984. The impact of such a vaccine on the remaining incidence of decay is unknown. The degree to which a vaccine will *replace* existing preventive methods is also open to question.

CONCLUSION

Preventive methods will change in publi programs and in practitioners' offices. In th short term such changes can be expecte to include:

1. increased use of occlusal sealants i public programs and dental offices;
2. revisions in office based program with preventive procedures chosen an applied selectively, based on the need of individual patients;
3. application of targeting concepts i public programs, both in populatio groups to be served, and in choice o preventive methods employed; and
4. increased attention in all preventiv programs to behavioral modificatio techniques.

The expected effects of these changes wi not be large, but the overall result will b a continuation of the decline in incidence o caries, clearly at a reduced rate quantita tively and probably proportionally as well The longer term changes and effects can not be predicted with any certainty, yet th mere presence of developmental activitie in new approaches to prevention suggest that dental caries may well become a uncommon disease in the future.

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James W. Brown, DDS
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ABSTRACT

Mercury hygiene, along with improved techniques and materials to minimize the potential for unsafe levels of atmospheric mercury, continue to be of interest to the dental profession. The introduction of the preproportioned amalgam capsule minimized the potential for accidental mercury spillage since it negated the need for mercury handling. Preproportioned capsules currently represent approximately one-half of alloy-mercury sales.

It is recognized that the trituration of both disposable and reusable amalgam capsules can result in the emission of mercury as vapour aerosols and an increase in atmospheric levels. Gough et al[1] measured mercury leakage during trituration from both capsule types with a mercury vapour sniffer and concluded that there was more leakage with the disposable capsules. Capdebosq and Von der Lehr[2] measured mercury emission by means of a weight loss analysis of the triturated capsules and found more leakage with reusable capsules. Recently, some manufacturers have advertised improved disposable capsule designs, with one claiming to have a leak-proof design (Valiant, L.D. Caulk, Milford, Delaware).

The purpose of this study was to compare and evaluate airborne vapour mercury levels from conventional non-disposable with currently available disposable amalgam capsules by combining both methods of evaluation. An answer was sought to the conflicting results of the aforementioned studies.

SOMMAIRE

Toujours soucieuse d'assurer de bonnes conditions hygiéniques dans les cabinets dentaires, la profession continue de chercher à améliorer les techniques et les matériaux en vue de restreindre le plus possible les taux dangereux de mercure dans l'air ambiant. Étant donné qu'elles éliminent la nécessité de manipuler le mercure, il va de soi que les capsules d'amalgame à dose réglée réduisent les possibilités de fuite accidentelle. Présentement, ces capsules représentent environ la moitié des ventes d'alliage de mercure.

C'est un fait reconnu que la trituration des capsules d'amalgame jetables et réutilisables peut entraîner l'émission de mercure sous forme de vapeur aérosol et une augmentation du taux de mercure dans l'air ambiant. À l'aide d'un renifleur de vapeur de mercure, Gough et al[1] ont mesuré les fuites de mercure durant la trituration des deux sortes de capsules. Ils ont découvert que les capsules jetables entraînent des fuites plus considérables. Par contre, Capdebosq et Von der Lehr[2] ont évalué les émissions de mercure en calculant les pertes de poids des capsules triturées et ils ont conclu que ce sont les fuites des capsules réutilisables qui sont le plus importantes. Dernièrement, certains fabricants ont fait la promotion de capsules jetables améliorées. Il y en a même un qui a prétendu qu'elles étaient à l'épreuve des fuites (Valiant, L.D. Caulk, Milford, Delaware).

Le but de la présente étude est de mesurer et de comparer les taux de vapeur de mercure se répandant dans l'air et provenant des capsules conventionnelles non jetables et des capsules jetables actuellement disponibles et ce, en combinant les deux méthodes d'évaluation. On a ainsi cherché une solution aux résultats contraires obtenus dans les deux études antérieures.

MATERIALS

The disposable preproportioned amalgam capsules evaluated (**Fig. 1**) were as follows:

1. Johnson & Johnson – Dispersalloy
2. S.S. White – Tytin
3. Kerr – Contour
4. Shofu – Indiloy

The non-disposable capsules evaluated (**Fig. 2**) were as follows:

1. Johnson & Johnson slide-on with a cylindrical metal pestle
2. Caulk slide-on with an hourglass plastic pestle
3. Kerr screw-on with a cylindrical metal pestle
4. Shofu screw-on with rubber "O" ring using a cylindrical metal pestle.

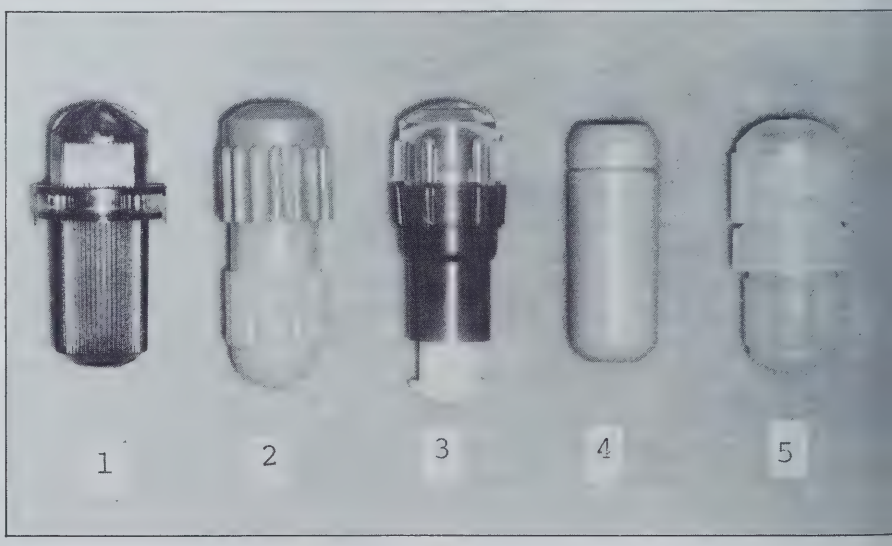

Fig. 1. *Disposable capsules evaluated: (left to right): (1) Johnson & Johnson Dispersalloy; (2) S.S. White, Tytin; (3) Kerr, Contour; (4) Caulk, Valiant; and (5) Shofu, Indiloy.*

METHODS

A Caulk Vari-Mix II* triturator was used in this study. The outer plastic housing was removed, the triturator was enclosed in a plastic bag with openings for the power cord and the triturator arms which were tied off to prevent the possibility of mercury droplets entering and contaminating the interior (**Fig. 3**).

The enclosed triturator was placed in a box with a known volume (0.037 m^3). The box had a hinged glass front panel which could be sealed closed. Portholes in the box provided entrances for the power cord and a plastic tubing extension from a J.W. Bacharach Mercury Vapor Sniffer** (**Fig. 3**). The Bacharach instrument was calibrated before and after the experiment by means of a dynamic calibrating system and was accurate to 0.002 mg/m^3.

Disposable Capsules

The alloy-mercury used in the disposable capsules was preproportioned by the manufacturer, and five capsules of each brand were tested. Capsules were handled with disposable plastic gloves. Each capsule was weighed on an analytical balance†, accurate to 0.1 mg.

The capsule was then placed in the triturator arm, the manufacturer's suggested trituating time was set, the front door closed and the vapour detector was "balanced" to a zero reading. After the room temperature was recorded, the triturator and a Heuer hand stop watch‡ were activated simultaneously. The amount of mercury vapour in the box was recorded at one-minute intervals for three minutes. The capsule was removed from the box and reweighed.

Statistical Test

The average airborne concentrations for all experiments were compared using the unpaired t-test[3]. This test determines whether the differences are statistically significant, i.e., the differences did not occur by chance.

RESULTS

Weight Changes

No figures have been reported for the weight loss analysis. It was decided that this method lacked sufficient sensitivity to properly correlate the apparent loss in weight of the capsule with the figures obtained from the vapour analysis. Several capsules demonstrated a gain in weight. A few capsules were weighed, inserted into the triturator arms but were not triturated, reweighed and demonstrated a weight loss. The loss of even 0.1 mg. mercury should have resulted in a highly significant reading (2.7 $mg./m^3$) on the mercury sniffer, which did not occur in any of the trials. It was concluded that the apparent weight-loss figures did not accurately reflect the actual loss of mercury from the capsules, and that the mercury sniffer was the superior system for recording mercury vapour emission.

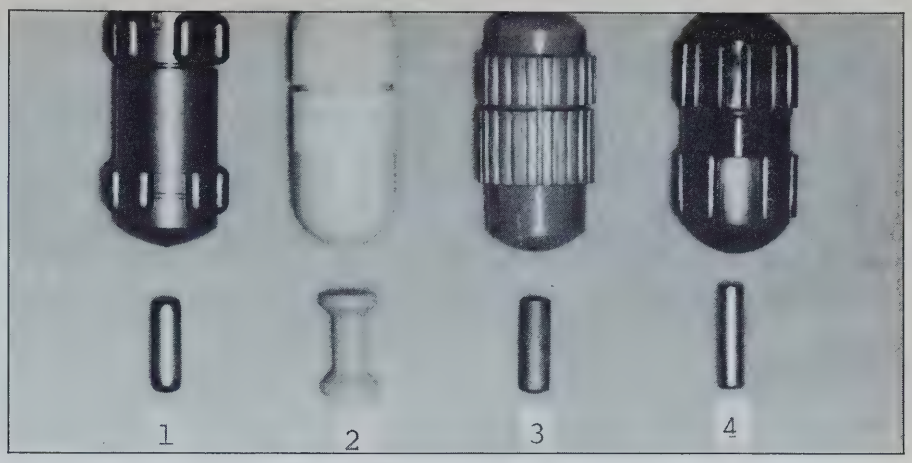

Fig. 2. Non-disposable capsules evaluated: (left to right): (1) Johnson & Johnson, (2) Caulk, (3) Kerr and (4) Shofu.

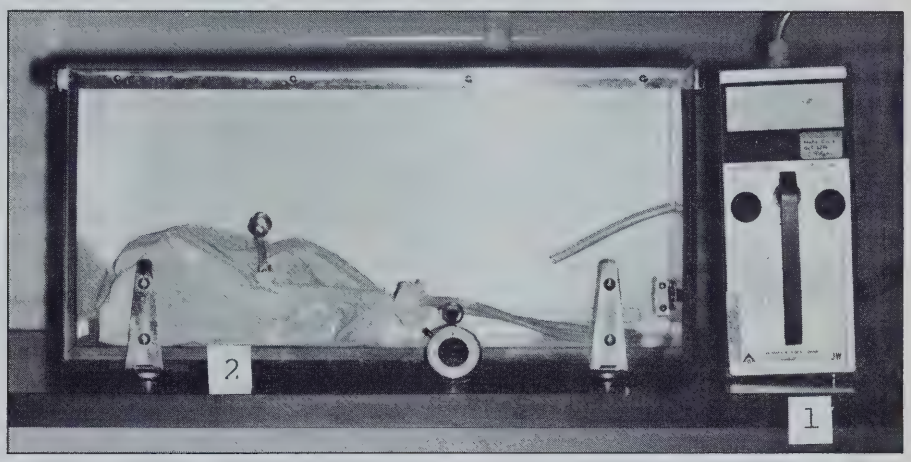

Fig. 3. Experimental set-up: (1) Mercury vapour sniffer, and (2) Triturator.

Reusable Capsules

Three capsules of each brand were used and each was tested three times. Each capsule was loaded with a two-spill, 50:50 mix from a Johnson & Johnson mercury-pellet dispenser; the evaluation technique was the same. The results of each test are shown in **Table I** and reflect the average amount of mercury released in the test chamber from the various capsules tested. The average room temperature for each trial is included in the table of results and shows a modest fluctuation of only 1.0°C.

The Shofu screw type with a rubber "O" ring produced the least amount of airborne mercury vapour, followed closely by the Caulk slide-on capsule. Next was the Johnson & Johnson slide-on capsule, with the Kerr screw type capsule producing the highest reading. The screw type capsules did not demonstrate their expected superiority. The average concentrations at each time period were significantly different from each other ($p < .001$).

Disposable Capsules

The results of each test are shown in **Table II**. The average room temperatures for the trials demonstrated a greater fluctuation of 3°C. This is well within the normal range of dental operatories and thus is not considered to be a significant factor in the results. The range of results is extremely close and, given the accuracy of the testing format, it would be difficult to demonstrate a proven superiority for any particular capsule design. At the one-minute interval, there were no differences between the average concentration for the reusable and the disposable capsules. At the other two time periods, the average concentrations of mercury vapour from the disposable capsules were significantly higher than the reusable capsules ($p < .001$).

* L.D. Caulk, Milford, Delaware.
** Brenton Equipment Co., Inc., Brisbane, Ca.
† Mettler HK 160, Mettler Co., Switzerland
‡ Trackstar Co., Switzerland.

DISCUSSION

The test chamber used in the experiment had a known volume which was a small fraction of a cubic metre. The smaller space was used to increase the sensitivity of the readings, to reduce the surface area to be decontaminated and to facilitate the purging of the chamber's atmosphere after each run. A chamber with a cubic metre volumetric capacity would have yielded lower figures; thus the figures presented are for comparative purposes. The authors recognize that the Bacharach instrument is incapable of accurately recording mercury vapour levels below 0.001 mg/m^3. However, transient concentrations below 0.001 mg/m^3 indicate a release of approximately 500 nanograms of mercury. Such concentrations are extremely small and thus do not significantly alter the results.

The American Conference of Government and Industrial Hygienists has recommended as a threshold limit value (TLV) a time-weighted average (TWA) concentration of 0.05 mg/m^3 of air for mercury vapour.[4] The results of this test show that both capsule types disseminate mercury in micrograms – not milligrams. Even in a very small, poorly ventilated dental office, it would be impossible to approach the 0.05 mg/m^3 of air TWA by using any of the tested capsule types or brands.

Although disposable capsules did not demonstrate a superiority, they offer many advantages over reusable capsules. The loading of mercury into dispensers and capsules carries the inherent risk of accidental spillage. Spilled mercury can enter cracks in counters, floor surfaces, can be absorbed into carpeting or found in air ducts. Mercury is extremely slow to volatize and if not detected or removed, may lead to time weighted average values above the prescribed limits, thus resulting in chronic mercury vapour exposure with possible toxic effects. Furthermore, when reusable capsules are used, especially the friction fit types, their leak-proof ability can be expected to diminish with time. In this study, two Johnson & Johnson reusable capsules which had been in constant use for one year were tested but failed to produce readings significantly different from their new counterparts. However, Newman[5] reported that when old friction capsules of another brand were tested, significant leakage did occur. It is impossible to state a safe range of time for the use of reusable capsules.

Attention should also be focused on the design of amalgam triturators. New designs are required which will not offer vertical porthole entrances for spilled mercury. Mercury accumulation within the triturator can be a significant source of mercury vapour emission. A well-functioning triturator is also essential. Hooper[6] reported a defective triturator had been shaking fine mercury droplets on the work bench. The 58-year-old dental assistant in the office presented with a four-month history of dropping dental instruments. Physical examination revealed diffusely decreased vibratory sense, slight difficulty in tandem gait walking and minimal hand tremors. Urinalysis revealed elevated mercury levels. The triturator was replaced and the assistant returned to work, but after two months she was found to be suffering from a chronic involution depression, which led her to retire from the profession and seek compensation from the dentist.

TABLE I

Reusable Capsules

Type	Triturator Setting	Temp. °C	Average Sniffer Reading 9 Readings (mg/m^3)		
			1 min.	2 min.	3 min.
Johnson & Johnson Slide-on	8 sec. M2	23.0	0.002	0.006	0.010
Caulk Slide-on	8 sec. M2	23.0	0.003	0.004	0.007
Kerr Screw-on	8 sec. M2	22.5	0.002	0.006	0.013
Shofu Screw-on	8 sec. M2	22.0	0.000	0.002	0.005
μ Average readings for time period =			0.002	0.004	0.009

TABLE II

Disposable Capsules

Type	Triturator Setting	Temp. °C	Average Sniffer Reading 9 Readings (mg/m^3)		
			1 min.	2 min.	3 min.
Dispersalloy	12 sec. M2	21.0	0.002	0.008	0.013
Tytin	4 sec. M2	23.5	0.005	0.006	0.008
Contour	17 sec. M3	22.0	0.003	0.007	0.010
Valiant	13 sec. M2	24.0	0.002	0.007	0.011
Indiloy	8 sec. M2	23.0	0.002	0.007	0.010
μ Average readings for time period =			0.003	0.007	0.010

CONCLUSION

Mercury leakage from either disposable or reusable capsules is not significant and the proper use of either type can be considered safe. However, the use of disposable capsules greatly reduces the risk of accidental spillage and the potential for elevated mercury vapour levels and associated health risks. Since it is impossible to state what constitutes a safe length of time in service for reusable capsules, practitioners using this system should give serious consideration to switching to the disposable capsule system, with all its accrued advantages.

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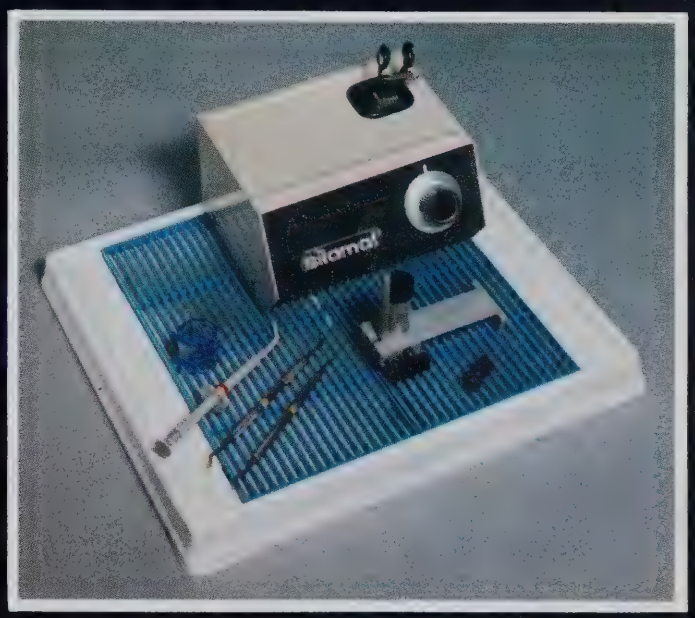

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HISTOLOGICAL EVALUATION OF DURAPATITE IN EXPERIMENTAL PERIODONTAL DEFECTS

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ABSTRACT

Durapatite, a non-resorbable ceramic hydroxylapatite, is currently being used as an implant material for the clinical treatment of osseous defects resulting from periodontal disease. Previous studies have demonstrated the biocompatibility of this material, however, histological evaluation in controlled experimental periodontal defects is minimal. The purpose of this study was to evaluate by histological methods the detailed response to durapatite in ligature-modified surgically created periodontal defects.

With the aid of a steel wire ligature chronic periodontal osseous defects were established distal to the maxillary canine teeth of four adult cats. Six weeks later after a chronic periodontal lesion had been established, all sites were re-entered, the wire and granulation tissue removed and the roots planed. Four of the defects were filled with durapatite and four sites were left as unfilled controls. Sixteen weeks later, the animals were perfused with formalin and the maxillae removed for processing by routine histological methods.

Repair of the control sites was characterized by the formation of a pocket epithelium, with collagen fibres arranged parallel to the root of the tooth. The defects filled with durapatite showed integration into the bony callus in the apical part of the defect, encapsulation by collagen fibres in the coronal portion of the lesion and connective tissue fibres and cells oriented parallel to the root surface at the ceramic particle interface. While the durapatite seemed to restore alveolar height, evidence of regeneration of a functionally orientated cell-fibre system was lacking. Although durapatite may have possible applications in the oral cavity where bone fill is desired, the treatment of periodontal defects should aim at restoration of the periodontium as a whole and not just alveolar bone.

SOMMAIRE

La durapatite, une hydroxylapatite céramique qui ne se résorbe pas, est actuellement utilisée comme matériau d'implant pour le traitement de défauts osseux causés par les maladies parodontaires. Bien que des études antérieures en aient démontré la biocompatibilité, l'évaluation histologique de défauts parodontaires expérimentaux contrôlés n'a pas encore été vraiment faite. Aussi cette étude a-t-elle pour but d'évaluer, à l'aide de méthodes histologiques, la pleine réaction des tissus exposés à la durapatite dans des défauts parodontaires causés par des ligatures modifiées chirurgicalement.

À l'aide de ligatures avec fil d'acier, on a suscité des défauts osseux parodontaires chroniques dans la région distale des canines maxillaires de quatre chats adultes. Six semaines plus tard, lorsque les lésions parodontaires furent bien développées, on a rouvert les plaies, on en a retiré le fil et les tissus granuleux et on a procédé au polissage des racines. Quatre des défauts furent obturés à la durapatite, les quatre autres plaies restant intactes pour servir de témoins. Seize semaines plus tard, on a administré une perfusion de formol aux chats et on leur a extrait les maxillaires afin d'entreprendre des procédures suivant les méthodes histologiques usuelles.

Le rétablissement des lésions témoins se caractérisait par la formation d'un épithélium en cul-de-sac, des fibres de collagène étant disposées parallèlement aux racines des dents. Pour les obturations à la durapatite, on remarquait, dans la partie apicale des défauts, une intégration dans le cal osseux et, dans la partie coronaire des lésions, un encapsulement avec des fibres de collagène. De plus, des fibres et des cellules tissulaires conjonctives étaient disposées parallèlement aux surfaces radiculaires à l'interface des particules de céramique.

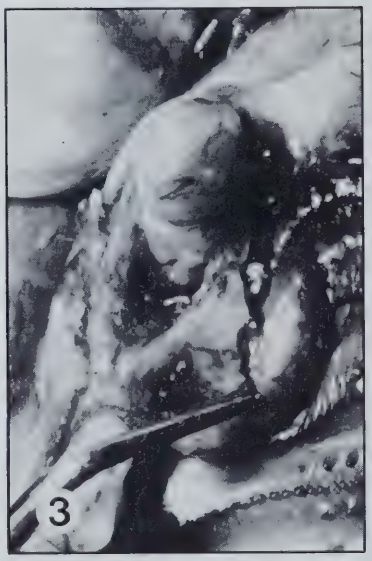
Bien que la durapatite ait semblé avoir restauré la taille alvéolaire, la preuve d'une régénération du système fibro-cellulaire pouvant fonctionner n'a pas été établie. Certes, cette matière peut être utile pour des obturations osseuses dans la bouche, mais le traitement des défauts parodontaires doit viser la restauration du parodonte complet et non seulement de l'os alvéolaire.

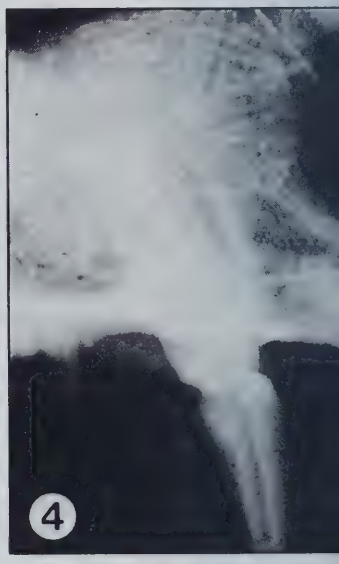
INTRODUCTION

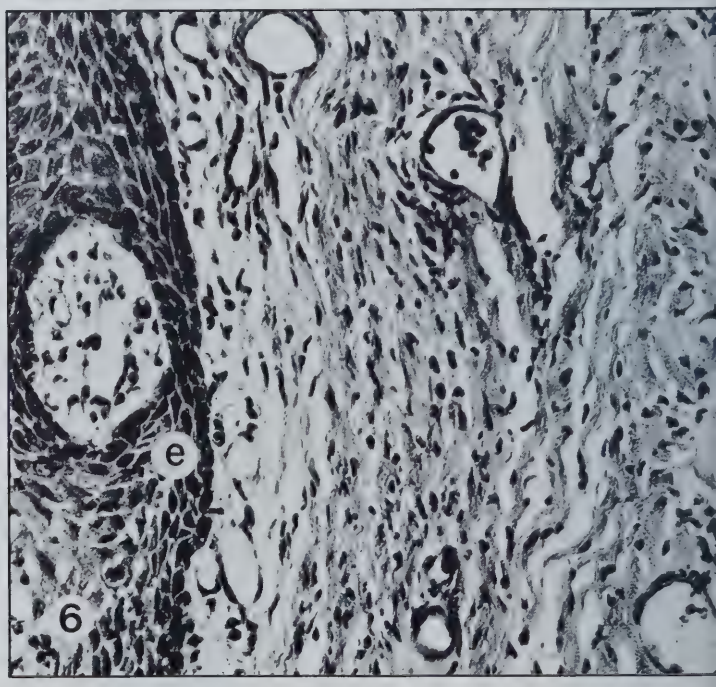
A number of surgical procedures are in use today for the treatment of osseous defects resulting from chronic periodontal disease.[1-3] While each has its own advantages, autografts, especially those utilizing iliac cancellous bone or bone marrow, seem to possess the greatest potential for the induction of new bone formation.[4-5] The requirement of an additional surgical site to obtain graft material, and the often limited amounts of graft obtainable are limitations to the routine use of this procedure.

Durapatite* is a non-resorbable hydroxylapatite ceramic currently available commercially. One of the indications for its use is as a non-osseous graft material for implantation into periodontal bony defects. This material offers the clinician convenience in handling and a virtually unlimited supply of graft material.

Durapatite has been shown to be safe and very well tolerated by host tissues. No systemic response and very little local inflammation accompany its implantation.[6] While histological evaluations of grafted periodontal defects in humans have shown little evidence of osteogenesis or cementogenesis,[7] clinical studies have demonstrated a significant fill of implanted osseous defects as compared to similar lesions receiving debribement procedures alone.[8] In addition, histological studies with surgically created infrabony defects in Rhesus monkeys have demonstrated a favourable soft tissue and osseous repair response following durapatite implantation.[9]







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To study the host response to graft material in experimental osseous defects, conditions similar to those of inflammatory periodontal disease must be established in the defect and surrounding connective tissues. Ligatures have successfully been used to induce such an inflammatory state in animals.[10-13] This study utilizes surgically created osseous defects modified by the placement of ligatures prior to durapatite implantation. The histology of the resulting graft, bone and root interfaces was examined, in an attempt to evaluate the ensuing reparative process.

MATERIALS AND METHODS

Four healthy adult cats, of both sexes, and approximately 4.5 kg in weight, were used for this study. The animals were of unknown age and parentage, and showed no signs of pre-existing periodontal disease. The study consisted of two components: the first component or pre-experimental phase, was used to establish a chronic peridontal lesion, and the second component or experimental phase was to test the durapatite in this model system.

Anaesthesia for both phases of the experiment was obtained by the administration of 0.4 mg atropine sulphate, followed by an intramuscular injection of ketamine HC1 (40 mg/kg). Lidocaine HC1 with 1:50,000 epinephrine was used as a local anaesthetic and to control hemorrhage.

PRE-EXPERIMENTAL PHASE — CREATION OF DEFECTS

Due in part to anatomical considerations in the cat and the desire to obtain a large root surface, the alveolar bone distal to maxillary canine teeth was chosen as a site for creation of the defects.

Full thickness mucoperiosteal flaps were raised bucally and lingually at each maxillary canine. Release, to allow the flaps to be readily retracted without tearing, was obtained by vertical incisions made in the incisor and first premolar regions. Using a number 6 round bur in an air turbine handpiece, with saline spray, a three-walled infrabony defect was created distal to each canine tooth. Defects were made parallel to the distal root surface, approximately 4-5 mm in depth and 4 mm in diameter. A 33½ inverted cone bur was used to notch the distal root surface at a level corresponding to the most apical extent of the defect. Coronally, a groove was placed around the tooth at a level parallel to the crest of the alveolar process.

Fine-diameter 0.011 orthodontic wire was ligated around the neck of the tooth and retained in place by the created groove. The ends of the wire were twisted together, the excess removed, and the twisted tailing placed into the defect (**Fig. 1**).

Flaps were repositioned for primary closure over the defect and sutured with 4-0 silk sutures. Seven days later, sutures were removed. Ligatures remained in place for six weeks, during which time plaque accumulation was encouraged by the use of a soft diet.

EXPERIMENTAL PHASE

At the end of the six-week period, all sites were re-entered surgically. Ligatures were removed and granulation tissue curetted from within the defects. The exposed root surfaces were planed to remove cementum and the area irrigated with saline.

Using a split mouth technique, left-sided defects were designated to receive durapatite and those of the right side served as controls. Control defects received no further treatment after debridement and flaps were simply repositioned and sutured.

Grafted defects were implanted with durapatite following the manufacturer's directions for placement into periodontal lesions. **Figure 7** shows a grafted site having received the durapatite. Flaps were reapposed for maximum coverage of the implant particles and the tissues were sutured.

Antibiotic coverage (tetracycline 250 mg/day) was provided for 7 days during soft tissue healing. All sutures were then removed and the animals placed on a hard diet, which kept plaque accumulation to a minimum.

Sixteen weeks after implantation, all animals were sacrificed by perfusion with 10 per cent neutral buffered formalin. The maxillae were dissected out and the canine region radiographed. Block sections containing the canine and adjacent control or implant site were removed and decalcified. The tissues were then processed by routine histological methods and sectioned at the midroot in a mesiodistal direction. Sections were stained with haemotoxylin and eosin for evaluation by light microscopy.

RESULTS

Pre-experimental Phase

Following defect creation, all gingival flaps healed by first intention. During the following six-week period, heavy plaque accumulation occurred about the canine teeth and the overlying gingival tissues became appreciably inflamed (**Fig. 2**). Surgical re-entry at the end of this period revealed granulation tissue in the defects and minimal osseous repair (**Fig. 3**). Clearly, ligature placement had contributed to the maintenance of a chronic inflammatory state, successfully preventing spontaneous healing and fill of the lesion.

Experimental Phase

a) Control Sites

At the end of the 16-week healing period, gingival recession at the distal aspect of the canines was considerable. Radiographically, a large area of radiolucency was observed at the distal alveolar process, indicating the presence of a remaining osseous defect (**Fig. 4**). **Figures 5** and **6** demonstrate the histology associated with the control defects. For uniformity, all photomicrographs are oriented with the root surface to the left and the crown facing toward the top of the page.

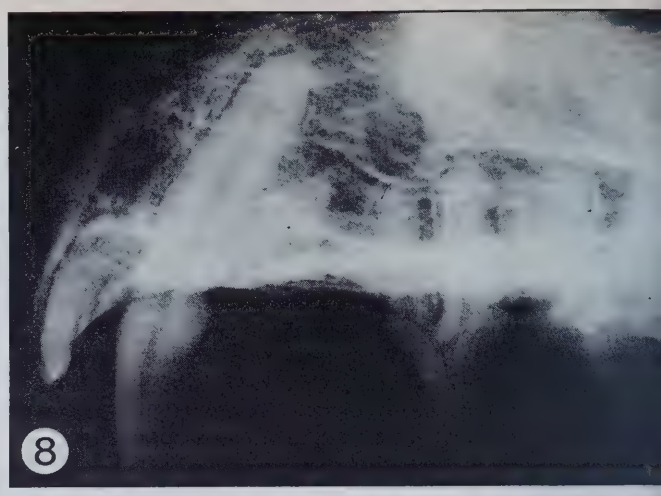
The alveolar crest occupied a level corresponding to the base of the original created defect, indicating 3-4 mm of bone loss. A large periodontal pocket was evident. Pocket epithelium had migrated apically along the root surface. Inflammation in the supracrestal connective tissues was present as well as a general disorganization of the connective tissue fibre systems. With the loss of alveolar bone, periodontal ligament as well as the obliquely oriented gingival connective tissue fibre systems had been lost (**Fig. 5**). New collagen, laid down in an orientation parallel to the root surface (**Fig. 6**) was indicative of an attempt at repair of the lost attachment. While some osteogenesis and cementum deposition occurred in the apical portions of the defect, regeneration of a functional periodontium was not observed.

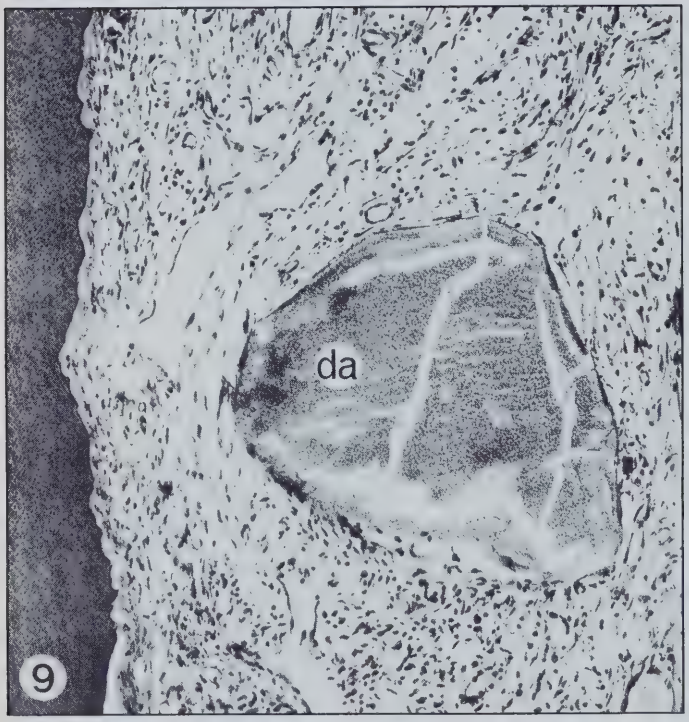
b) Implant Sites

Following durapatite placement, little exfoliation of graft material was observed during the 16-week experimental period. Since durapatite is radiopaque, radiographs demonstrated a uniformly dense area in the graft regions (**Fig. 8**). Alveolar height distal to the canine appeared to have been maintained, suggestive of considerable defect fill. Because of the retained support, gingival recession in the area was minimal. Histologically, a much smaller periodontal pocket was present as compared to control sites, and minimal apical epithelial migration had occurred. The implant site was considered as consisting of two equal zones for description of its detailed histological characteristics. A coronal zone (**Figs. 9** and **10**) and an apical zone (**Figs. 11** and **12**).

Coronal Zone

Durapatite particles were surrounded by a fibrous tissue encapsulation. Minimal inflammation was present in the durapatite containing connective tissues (**Fig. 9**). Where graft particles were tightly packed, the encapsulation was dense, consisting of thick collagen fibre bundles and active fibroblasts (**Fig. 10**). Where implant particles were in close proximity to the root surface, the periodontal ligament space was occu-





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pied by fibroblasts, and collagen fibres with orientation predominantly parallel to the root surface (**Fig. 9**). As in the control lesions, no regeneration of an organized fibre system was seen.

Apical Zone

Considerable new bone formation was observed. Bone deposition was occurring coronal to the apically placed notch, indicating that bony fill of the defect was occurring. New bone was compact in nature, with large numbers of viable osteocytes and osteoblasts.

In most instances, bone had been deposited around durapatite particles with no space between graft and bone (**Fig. 11**). In the apical periodontal ligament space, no evidence of regeneration of a functional periodontium was observed. While some sections showed cementogenesis in the notch area, Sharpey's fibres were lacking. A frequent finding, however, was new bone formation extending around graft particles and along the periodontal ligament space. In some specimens, fusion of this bone matrix with the exposed root dentine had occurred (**Fig. 12**), forming a bridge between tooth and graft particles. This matrix was, in some cases, continuous with the residual alveolar crest.

DISCUSSION

Durapatite is a radiodense, non-resorbable implant material which when grafted into periodontal osseous defects is extremely well tolerated by host tissues. These properties together with the ensuing new bone formation give grafted sites a good clinical and radiographic appearance. Although alveolar height is maintained or regenerated following grafting, one cannot, however, equate the good radiographic appearance with production of new attachment to the root surface.[14,15]

The definition of regeneration of the periodontium includes the production of new bone, cementum and periodontal ligament.[16,17] Histological observations from this study indicate that while some of these components were produced, a significant regeneration of the periodontium following durapatite implantation was not achieved.

The absence of an apically migrating pocket epithelium in implanted sites may be a significant finding. While this may simply be due to the physical presence of a bulk of non-resorbable graft material in the defect, the close association of the collagenous material, new bone and durapatite particles with the root surface may also contribute to exclude epithelial migration. Therefore, while durapatite may not directly stimulate periodontal regeneration, it may aid in the establishment of conditions in the periodontium more conducive to repair.

The finding of osteogenesis following durapatite implantation is consistent with other studies which have proposed that hydroxylapatite ceramic may act as a nidus or scaffold around which new bone is deposited.[6,9,18] Why this osteogenesis occurred only in apical portions of the defect, and the soft tissue encapsulation occurred predominately in the coronal portion of the defect is not known. Perhaps inflammatory influences present about the gingival tissues may inhibit or delay mineralization in the coronal connective tissues. Bony fill of the lesion may in time become complete, so as to completely restore the alveolar process with new bone.

The apparent fusion of the new bone to the dentinal root surface is an interesting observation. While not a frequent finding following grafting procedures, root resorption and ankylosis have been reported following the placement of autogenous bone and marrow grafts.[19,20] It has been proposed, that ankylosis may follow surgical injury to the periodontium.[21] Whether the ankylosis observed in this experiment was in some way caused by the surgical production of the defects, or is a consistent finding following durapatite implantation could not be determined. However, the proximity of graft particles to the root surface and the osteoconductive ability of durapatite may increase the probability of osteoblasts populating the periodontal ligament space. The resulting bone formation in the ligament space may prevent the formation of a proper connective tissue attachment, and as a result, lead to ankylosis.[22-24] While such an ankylosis undoubtedly increases the stability of the tooth in the short term, the long-term stability of such a situation is questionable.

The osteoconductive properties of durapatite suggest that this material, in addition to any possible applications in restoring periodontal defects, may have other uses in the oral cavity where bony fill is desired. However, it is perhaps important to emphasize the fact that treatment of periodontal defects should aim at restoration of the periodontium as a whole, and not just alveolar bone.[24] Furthermore, it must be underscored that although new methods to regenerate periodontium must be sought, the only predictable method of controlling the progression of periodontal disease is by plaque control and continuous, regular scaling and root planing.[25,26]

The authors wish to thank Mr. D. Wagner for his excellent technical assitance, and Mrs. C. Chu for her help in preparation of the manuscript.

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***John Boetto** is the recipient of a Medical Research Council of Canada Summer Studentship at the Faculty of Dentistry, University of Toronto.*

Fig. 1. *Fine-diameter 0.011 orthodontic ligature wire placed into a surgically created infrabony defect at the distal surface of the maxillary canine.*

Fig. 2. *Abundant plaque accumulation about ligature wire after 6 weeks. Note marked inflammation of the gingival tissue.*

Fig. 3. *Control site. Granulation tissue has been curetted and the root planed.*

Fig. 4. *Radiograph of the control site 16 weeks postoperative. A deep osseous defect is present distal to the canine tooth.*

Fig. 5. *Montage photomicrograph of the control site at 16 weeks postoperative. Apical migration of the junctional epithelium has occurred and pocket formation is evident. New cementum (c) has been deposited on the dentine (d) at the apical portion of the defect (b) alveolar bone. (Haematoxylin and eosin × 74.)*

Fig. 6. *High power photomicrograph of the area indicated with an asterisk (*) in Fig. 5. Collagen fibre bundles are oriented parallel to the pocket epithelium (e). (Haematoxylin and eosin × 440.)*

Fig. 7. *Periodontal defect implanted with durapatite.*

Fig. 8. *Radiograph of the implanted site 16 weeks postoperative. The osseous defect is radiodense and alveolar height appears to be maintained.*

Fig. 9. *Photomicrograph of the coronal zone of the implant site. Durapatite root interface. Inflammation is absent. Encapsulation of the ceramic particle (da) has occurred and connective tissue fibres and cells are oriented parallel to the root surface. (Haematoxylin and eosin × 150.)*

Fig. 10. *Photomicrograph of the coronal zone of the implant site. Durapatite particles encapsulated by dense collagen fibre bundles. (Haematoxylin and eosin × 200.)*

Fig. 11. *Photomicrograph of the apical zone of the implant site. Trabeculae of bone surrounding durapatite particles. The implanted ceramic particles appear to have a scaffolding effect. (Haematoxylin and eosin × 95.)*

Fig. 12. *Photomicroph of apical zone of the implant site. Extension of bony matrix surrounding durapatite particles into the periodontal ligament space. Fusion to the root surface has occurred (Haematoxylin and eosin × 160.)*

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THE HEMI-MONOBLOC

Robert M. Hamilton, DDS, FRCD(C)
Oakville, Ont.

ABSTRACT

Functional appliance therapy as an orthodontic treatment modality is becoming popular in North America. Although easily constructed and inserted, the functional appliances require a sophisticated knowledge of facial growth and development. Certain of the appliances are harder for the patient to tolerate than others. An appliance is presented that is relatively well tolerated and has proved to be successful in selected cases.

SOMMAIRE

Comme mode de traitement orthodontique, la thérapie au moyen d'un dispositif fonctionnel devient de plus en plus populaire en Amérique du Nord. Bien qu'ils soient faciles à construire et à installer, les dispositifs fonctionnels exigent une connaissance très approfondie de la croissance et du développement du visage. Certains dispositifs se tolèrent moins bien que d'autres. Le présent article présente un dispositif qui se tolère relativement bien et qui, dans certains cas, a donné d'excellents résultats.

INTRODUCTION

The author presents herewith a functional appliance of his own design (**Figs. 1 and 2**), which is called a hemi-monobloc, and is in large measure a modification of the activator or monobloc. Like all appliances, this modification has limited application. In selected cases it has proven to be useful in helping to reduce excessive overbites (**Figures 3 and 4**), overjets and distocclusions (**Figs. 5 and 6**). Its chief advantage relative to the standard monobloc is the ease with which it is tolerated by a patient with a compromised nasal airway. The appliance was designed originally for chronic allergy patients who could not tolerate a regular monobloc. Two cases are shown which illustrate orthodontic problems amenable to hemi-mono-

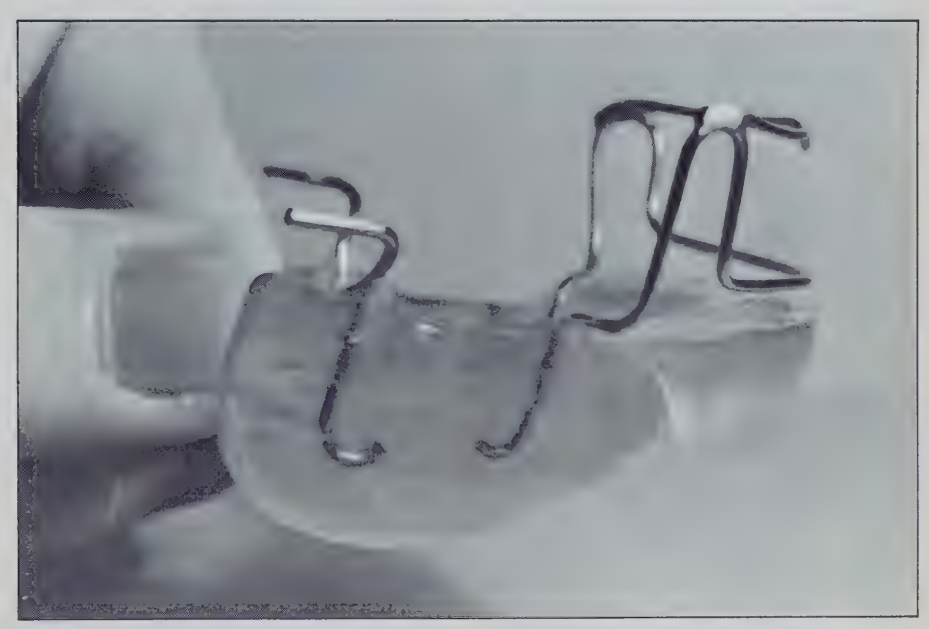


Fig. 1. *The Hemimonobloc — side view.*

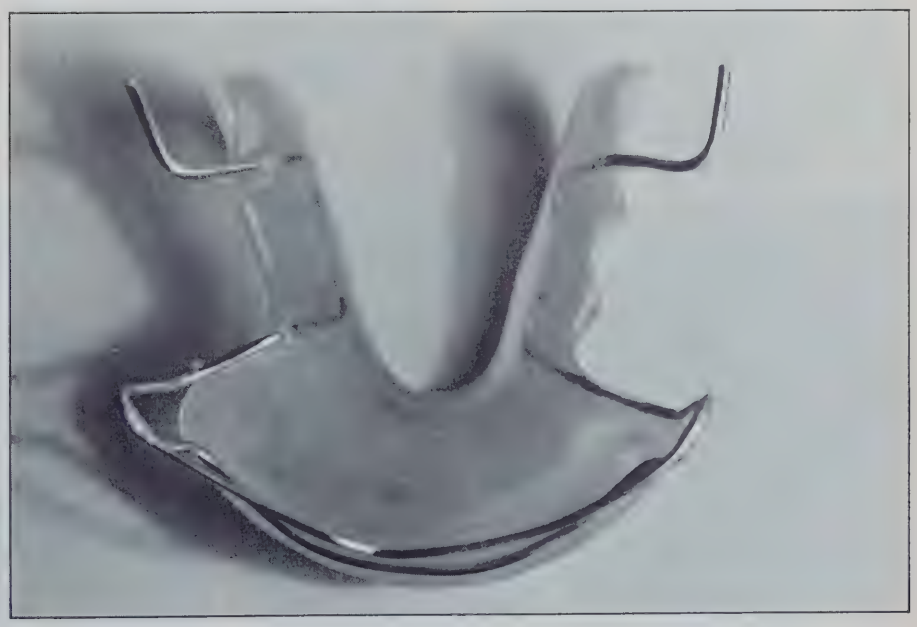


Fig. 2. *The Hemimonobloc — top view*

Fig. 3. Skeletal deep bite case prior to treatment.

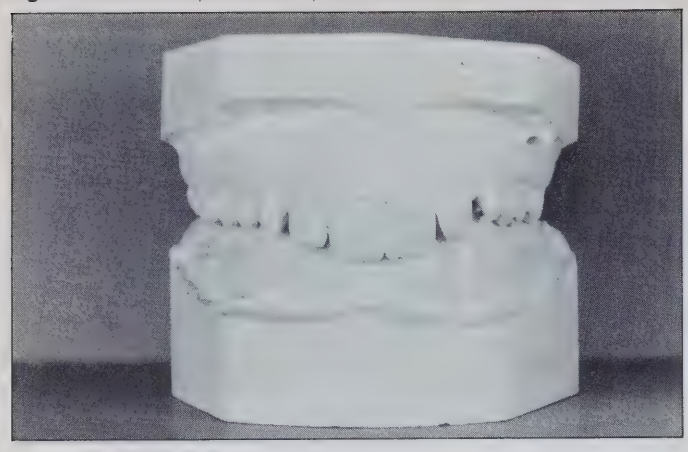
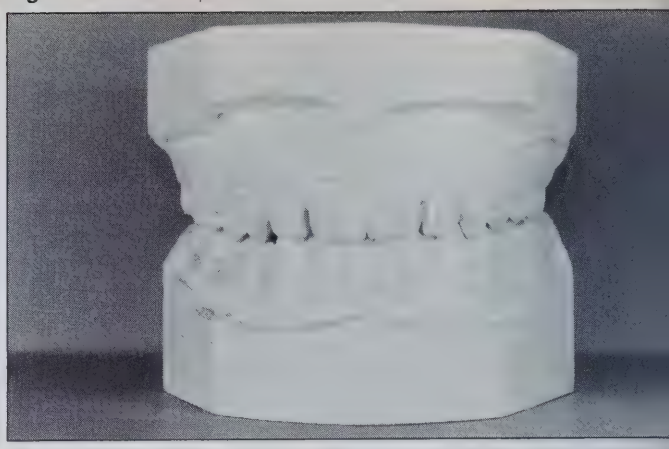


Fig. 4. Skeletal deep bite case after treatment.



bloc treatment. **Figures 3, 4, 7** and **8** show a skeletal deep bite case and **Figures 5, 6, 9** and **10** show a protrusion case.

The monobloc was conceived by Andresen and Haupl[1] about 50 years ago. Whereas North American fixed band philosophy anticipated altered function to follow a mechanically induced change in morphology, conversely the monobloc concept is predicated on a neuromuscular functional alteration, causing a beneficial change in morphology.

Monobloc use, for practical purposes, was introduced into North America by Harvold,[2-4] and its altered concept of treatment was immediately appreciated and promoted by Woodside and Moyers. At that time, the mention of functional appliances and their rationale provoked heated controversy in North American orthodontic circles. From these limited beginnings, functional appliance therapy has steadily increased in use.

The neuromuscular physiological mechanisms by which functional appliances work are not completely understood. A practitioner should not attempt to use a functional appliance unless he has acquired an in-depth knowledge of facial growth and development. Even then, some clinical results may be disappointing.

DESCRIPTION

The appliance (**Figs. 1,2**) consists of a hawley type anterior arch and high labial wire anchored in a mandibular plastic section consisting of lingual flanges, a maxillary incisor bite plane, and standard lower incisor slot in which the plastic overlaps onto the labial surfaces of the mandibular incisors. First permanent molar occlusal stops of 0.040 wire extrude superiorly from the distal areas of the lingual flanges.

The appliance can be modified in various ways. **Fig. 1** shows a high labial section to aid in keeping the maxillary incisors behind the wire work. Automatic hawleys have been incorporated into the appliance. The molar occlusal stops can be extended as hooks to engage Class 111 elastics, which in turn may be attached to a mandibular labial arch to extrude mandibular molars.

In general, the wax bite is taken in protrusion and open 4 or 5 mm. beyond rest. The bite registration will vary with the characteristics of the malocclusion. The taking of activator bites is well covered by Woodside.[5]

DISCUSSION

The hemi-monobloc is a deceptively simple looking appliance, in terms of laboratory construction. However, like all functional appliances, it requires a rather sophisticate knowledge of jaw growth and developmen for its successful use.

The hemi-monobloc appears to functio similarly to an activator. In Class II case the muscles of mastication are harnessed t hold back the forward maxillary alveola development while the mandible grows fo ward at its own growth rate. Definitive art cles on activator function appear els where.[1,2,4,5] The extrusion of incisors impeded by bite planes and the applianc is prevented from rotating clockwise by th presence of maxillary molar wire occlus stops. These stops, in turn, minimize maxi lary molar extrusion but allow for mand bular molar extrusion, and therefore foste Class I molar development in line with th principles of differential molar eruption a conceived by Harvold.[3]

The molar occlusal stops can be mod fied as Class III hooks. The appliance ha been used by the author in conjunction wi a mandibular labial arch and Class III ela tics to intensify mandibular molar extrusio while retarding maxillary molar eruptio Automatic hawleys have been incorporate into the wire work and have been used conjunction with band therapy.

As with a typical activator, one mu exercise extreme caution if the potenti

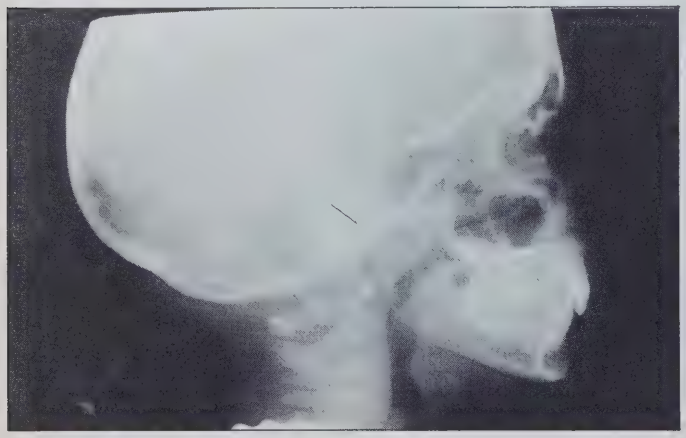


Fig. 7. Skeletal deep bite lateral ceph. prior to treatment.

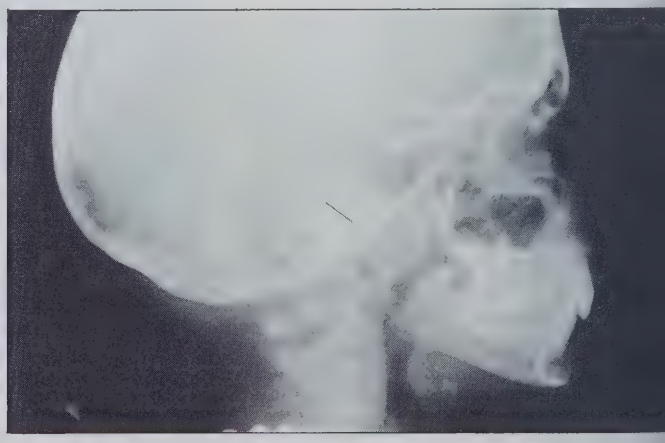


Fig. 8. Skeletal deep bite lateral ceph. after treatment.

Fig. 5. Distocclusion case prior to treatment.

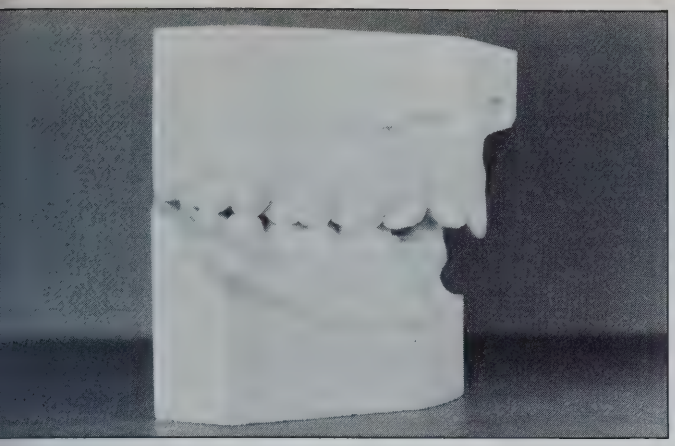
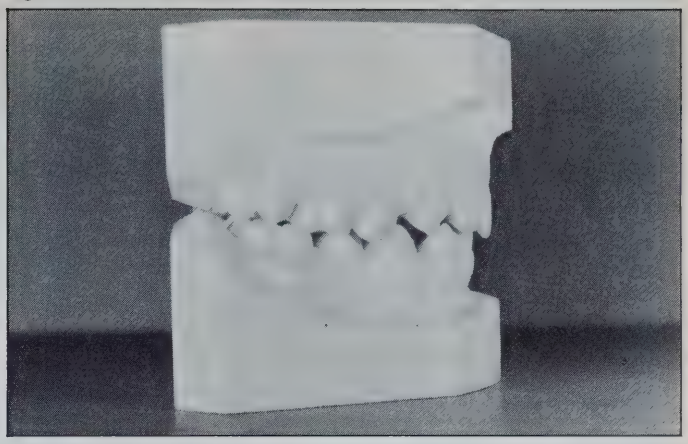


Fig. 6. Same case after treatment.



wearer exhibits excessive lower vertical face height. Conversely, the appliance often has good application in the skeletal deep bite type of case (**Figs. 3** and **4**).

The case shown in **Figures 3** and **4** had extractions and upper bands for alignment, but most orthodontists would agree that the cephalometrix x-rays (**Figs. 7** and **8**) indicate a better overbite correction than would be expected from one arch treatment alone. Because of its relatively small size, the appliance has greater potential than an activator to be worn part-time during the day (as well as at night).

CEPHALOMETRIC ANALYSIS

In both cases, cephalometric tracings were superimposed and the changes analysed. Three standard methods were employed: a superimposition at sella and along anterior cranial base for general skeletal changes; b) superimposition at mandibular symphasis and along inferior mandibular border for mandibular changes; c) superimposition at anterior nasal spine and along maxillary base for maxillary changes.

In the skeletal deep bite case illustrating overbite reduction (**Figs. 7** and **8**), overall facial growth has been expressed in a primarily downward direction. Mandible superimposed on mandible showed 3 mm of lower molar eruption and no forward tipping of the lower incisors. There has been over 6 mm of mandibular growth in 19 months. Maxilla superimposed on maxilla showed almost no upper molar eruption and an absolute intrusion of upper incisors of 3 mm, presumably helped along by maxillary bands.

In the case illustrating Class II correction and overjet reduction (**Figs. 9** and **10**), there was good downward and forward mandibular growth and less forward maxillary growth. Mandible superimposed on mandible showed 2 to 3 mm of lower molar eruption and a very small amount of forward lower incisor tipping. The mandible increased about 6 mm in length during 28 months of appliance wear. Maxilla superimposed on maxilla indicated no more than 1 mm of upper first molar eruption. The upper incisors appeared tipped very slightly backwards.

The above results are consistent with those observed in many successful monobloc cases. Improvements were obtained through a combination of fortuitous mandibular growth, differential molar eruption, and altered dento-alveolar morphology.

CONCLUSIONS

A functional appliance of original design is presented. It appears to function similarly to a monobloc and is compatible with Harvold's concepts of differential molar extrusion. It is well suited for patients with compromised nasal breathing ability, being more easily tolerated than a full monobloc.

***Dr. Hamilton** is an associate in dentistry at the Faculty of Dentistry, University of Toronto, and is engaged in the private practice of orthodontics. Reprint requests to Dr. Hamilton, 358 Reynolds Street, Oakville, Ontario L6J 3L9*

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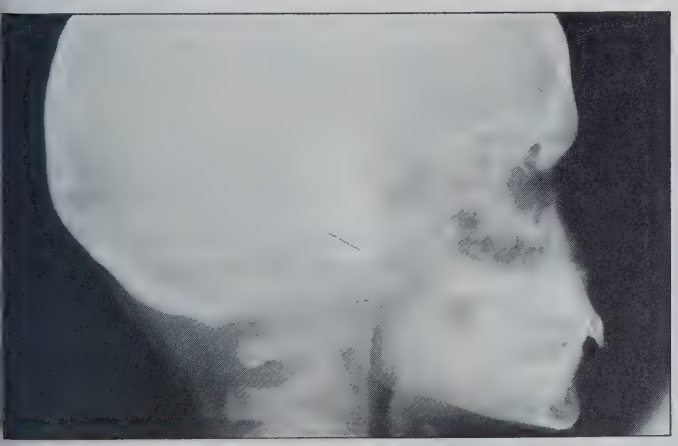

Fig. 9. Ceph. of Fig. 5 and 6. case prior to treatment.

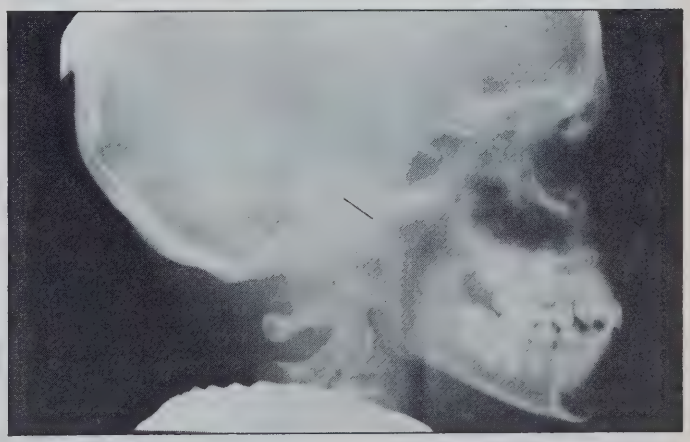

Fig. 10. Ceph. of Fig. 5 and 6. case after treatment.

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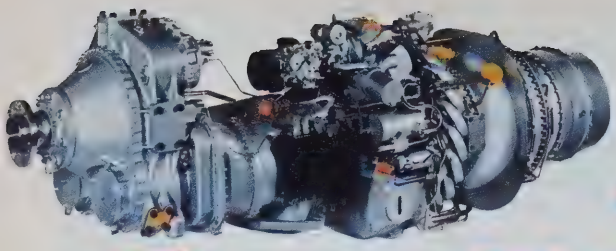

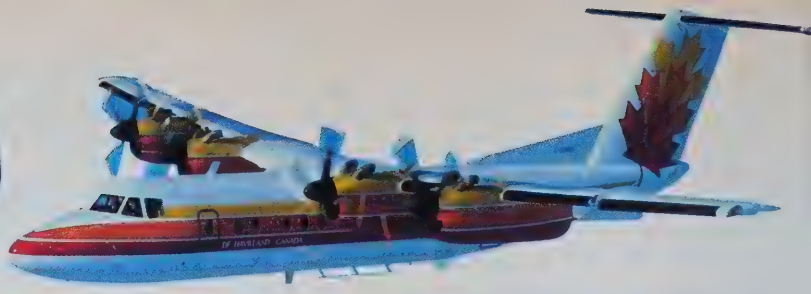

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CANADIAN FUND FOR DENTAL EDUCATION

Announcements

MARCH/MARS

March 17-24: International Dental Seminars announces the 11th International Alpine Dental Conference, Hotel Annapurna, Courchevel, 1850, France. Contact: International Dental Seminars, 24 Cadogan Square, London, SW1X 0JP, England.

March 18-30: Advanced Paedodontics Course 338. The British Council, London, Newcastle upon Tyne. Contact: The British Council, c/o The British High Commission, 80 Elgin St., Ottawa, Ont., K1P 5K7.

March 21-24: Western Canada Dental Society Bonspiel and Convention, Regina, Saskatchewan. Contact: Dr. Brian Knoblauch 440-2045 Broad St., Regina, Sask., S4P 3T7 for registration.

March 23: Dental Horizons Inc. will be giving a seminar entitled "Effective Practice Management Techniques: The Ideal Practice" at New York University. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, New York, 10468, 212-933-5510.

APRIL/AVRIL

April 2-4: NIH Consensus Development Conference on Osteoporosis, Masur Auditorium, Clinical Centre, National Institutes of Health, Bethesda, Maryland. Contact: Peter Murphy, Prospect Associates, 2115 East Jefferson St., Suite 401, Rockville, MD USA 20852.

April 4: Health League of Canada presents a public forum on sexually transmitted diseases, during National Health Week, St. Laurence Centre, Toronto, Ontario. Contact: Health League of Canada, 1560 Bayview Ave, Suite 304, Toronto, Ont., 416-486-6023.

April 4-8: Dental Horizons Inc will be presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice". Paradise Island, The Bahamas. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, New York, 10468. 212-933-5510.

April 6-7: The Royal College of Dentists of Canada Annual meeting with convocation and dinner, Montreal, Quebec. Contact: Kay Montgomery, Executive Secretary, The Royal College of Dentists of Canada, 170 St. George St., Suite 614, Toronto, Ont., M5R 2M8, 416-964-7263.

April 6-7: Canadian Academy of Restorative Dentistry annual meeting, Montreal, Quebec. Contact: Dr. Berl Mendel, # 216, 5757 Decelles Ave, Montreal, Que., H3S 2C3, 514-342-2549.

April 8-10: The Canadian Academy of Periodontology and the Society of Periodontists of Quebec, 1984 Annual Meeting, Montreal, Quebec. Contact: Dr. Allen Wainberg, Secretary, CAP, 5845 Cote des Neiges, Suite 300, Montreal, Quebec, H3S 1Z4.

April 8-12: Conjoint convention of the Canadian Dental Association and the Ordre des dentistes du Québec "Les Journées Dentaires 1984", Palais des Congrès, Montréal, Québec. Contact: Dr. Michel Jahjah, General Chairman, 3565 rue Berri, Bureau 200, Montréal, Québec, H2L 4G3, 514-842-9112.

April 24-26: Conference presented by the National Institute of Mental Health and the Office of Medical Applications of Research of the National Institutes of Health (NIH) on "Mood Disorders: Pharmacologic Prevention of Recurrances". Masur Auditorium, The Warren Grant Magnuson Clinical Centre, NIH, Bethesda, Maryland. Contact: Ms. Michelle Dillon, Prospect Associates, 2115 East Jefferson St., Suite 401, Rockville, Maryland, 20852.

April 28-29: The American Association of Dental Consultants fifth annual spring workshop, Windsor, Ontario, Hilton International. Contact: Dr. Ed Mazak, c/o Green Sheild, 285 Giles Blvd, E., Box 1606, Windsor, Ont., N9A 6W1. 519-255-1133.

MAY/MAI

le 5-7 mai: La Société Française de Parodontologie will hold VIIIe Journées Française Internationales de Parodontologie. Arles, France. Renseignement: Société Française de Parodontologie, 57 rue Amsterdam 75008, Paris, France.

May 6-9: College of Dental Surgeons B.C. annual meeting, Victoria, B.C. Co tact: Myron Faryna, Convention Chairma 1704-1200 Alberni St., Vancouver, B.C V6E 1A6, 604-681-5226.

May 11-12: Continuing Educatio Course: Periodontal-prosthodonti with Dr. Ralph Yuodelis, Edmonto Alberta. Contact: Triple G. Dental Sem nars, 11223 76th Avenue, Edmonto Alberta, T6G 0K2, 403-439-0218 403-433-9773.

May 13-16: Ontario Dental Associati 117th Annual spring meeting. T Sheraton Centre, Toronto, Ontario. Conta Mrs. A. M. Durham, 234 St. George S Toronto, Ont., M5R 2P1, 416-922-390

May 15: University of Toronto, Facul of Dentistry, Class of '54 holding i 30th reunion, Trillium Room, Onta Place, Toronto, Ontario. Contact: I Wayne H. Tester, 305 Glendale Avenu St. Catharines, Ontario, L2T 2L 416-227-7007 for information.

May 18-20: Port Arthur Collegia 75th Anniversary reunion, Thunder Ba Ontario. Contact: Registration Committe FACI, 401 Red River Rd., Thunder Ba Ont., P7B 1B4.

JUNE/JUIN

June 3-5: Alberta Dental Associati Convention, Banff Alberta, Banff Sprin Hotel. Contact: Drs. Wood or Zaharichu 3616 54th Ave., S.W., Calgary, Alt T3E 5H4.

June 4-7: International Association Oral Pathologists general meetin Noordwijkerhout, The Netherlands. Co tact: Congress Secretariat, 2nd meeting the International Association of Oral Path ogists, c/o Mrs. R. Mooijen, AZVU, Path ogisch Instituut, De Boelelaan, 1117, N Amsterdam, The Netherlands.

June 8: Dental Horizons Inc are prese ing a seminar entitled "Effective Pra tice Management Techniques: The Ide Practice", Einstein, New York. Conta Dr. L. Zucker, 3201 Grand Concourse, T Bronx, New York, 10468, 212-933-55

une 10-16: **XIII Biennial Conference on Dental Research and Education**, University of Manitoba, Winnipeg, Manitoba. Contact: The Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man.

une 10-16: **The Association of Canadian Faculties of Dentistry is holding its annual meeting**, Gull Harbour, Becla Island, Manitoba. Contact: Dr. Lindsay Gibson, University of Manitoba, Faculty of Dentistry, 780 Bannatyne Ave., Winnipeg, Man., R3E 0W3.

une 14-17: **104th Annual Meeting of the British Dental Association** in association with the 3rd International Quintessence Symposium and the 2nd International Symposium on ceramics, Barbican Centre, London, England. Contact: The British Dental Association, 64 Wimpole St., London, England, W1M 8AL.

une 19-22: **The 6th International Conference on Periodontal Research**, Kibbutz Shefaim, Israel. Contact: The Sixth International Conference on Periodontal Research, P.O. Box 394, Tel Aviv, 61003, Israel.

une 21-24: **The International Congress of Oral Implantologists World Congress VII for Oral Implantology**, Munich, West Germany. Munich Sheraton Hotel. Contact: Clifford J. Kirschner, Executive Director, The International Congress of Oral Implantologists, P.O. Box 2277, Grand Central Station, New York, New York, 10163, 201-783-6300.

une 23-25: **Florida Dental Association 1984 Florida Dental Congress**. Buena Vista Palace, Lake Buena Vista, Orlando, Florida. Contact: Florida Dental Association, 3021 Swann Ave., Tampa Florida, 33609. 813-877-7597.

ULY/JUILLET

uly 1-6: **Ninth Annual Congress of Dietetics**, Toronto, Ontario. Hilton Harbour Castle Hotel. Continuing education credits will be assessed for both ADA and CDA registered dieticians. Contact: Congress Canada, Suite 603, 250 University Avenue, Toronto, Ont., 416-591-1498.

AUGUST/AOÛT

August 12-17: **The New Zealand Dental Association is holding its biennial conference**, Auckland, New Zealand. Contact: Dr. N. P. Ewart, Conference Secretary, P.O. Box 28085, Auckland 5, New Zealand.

August 18-24: Canadian Society of Forensic Science 31st annual conference. Viscount Gort Flag Inn, Winnipeg, Manitoba. Contact: Executive Secretary, 613-235-7112 or write: Canadian Society of Forensic Science, 171 Nepean St., Suite 303, Ottawa, Ontario, K2P 0B4.

August 23-25: New Orleans Dental Association annual dental conference. Contact: Dr. Anthony J. Miranda, General Chairman, 3332 Woodlawn Ave., Metairie, LA., USA 70002. 504-888-5681.

August 25-31: 72nd Annual World Dental Congress of the FDI, Helsinki, Finland. Contact: FDI '84, Helsinki 8, SF 00100, Helsinki, 10, Finland.

SEPTEMBER/SEPTEMBRE

September 9-15: McKay Sub-Branch of the Australian Dental Association will be hosting the North Queensland Dental Convention on Hayman Island. Contact: The Secretary, North Queensland Dental Convention, P.O. Box 838, MacKay, 4740, Australia.

September 14-16: The Canadian Academy of Endodontics twentieth annual meeting. Chateau Lake Louise, Lake Louise, Alberta. Contact: Dr. Carl Hawrish, 762-10830 Jasper Ave., Edmonton, Alta., T5J 2B3, 403-425-8930.

OCTOBER/OCTOBRE

October 1-3: American Equilibration Society Satellite Program, Hyatt Regency Hotel, Acapulco, Mexico. Contact: The American Equilibration Society, 8726 North Ferris Ave., Morton Grove, Illinois, 60053, 312-965-2888.

October 4-5: Eighth International Congress of Dental Technicians, Cologne, Germany. Contact: Messe-und Ausstellungs Ges. m.b.h., Koln, Messeplatz, Postfach 210760. D-5000, Koln, 21, Deutz.

October 18-20: The American Association of Public Health Dentistry 47th annual meeting, Atlanta, Georgia. Abstracts must be submitted by May 1, 1984 to: Dr. Myron Allukian, Program Chairman, 818 Harrison Ave., Boston, Mass. USA, 02118.

October 18-20: Canadian Academy of Prosthodontics Annual meeting, Toronto, Ontario. Contact: Dr. B.M. Jackson, 22-22 Water St., S. Kitchener, Ont., N2G 4K4.

October 28: Dental Horizons Inc. is presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice", Bronx New York. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, New York, 10468, 212-933-5510.

NOVEMBER/NOVEMBRE

November 5-10: 11th Asian Pacific Dental Congress, Excelsior Hotel, Hong Kong. Contact: Congress Secretariat, International Conference Consultants, 57 Wyndham St., First Floor, Central, Hong Kong.

November 14-16: Scandinavia's largest international trade fair "Swedental '84" will be held in Stockholm, Sweden. Contact: Strusberg/Hewitt/Radley, U.S. representatives, 6671 Sunset Blvd., Suite 1525, Los Angeles, California, 90028, 213-462-6260.

November 22: The Toronto Academy of Dentistry Winter Clinic, Royal York Hotel, Toronto, Ontario. Contact the Academy, 234 St. George St., Toronto, Ont., M5R 2P2. 416-967-5649.

ADVERTISERS INDEX

Allan's Travel Service Ltd. . . . 198
Amalgamated Dental 205
C and B. Dental Labs 204
CDSPI 206, 211, 238, 249
L. D. Caulk Co. 212
Conference Travel 238
Cooper Laboratories . OBC, IBC, 199
Den Mat Corp. 194
Dentsply International 220
East West Travel and Tour Corp. 204
Edmonton Board of Health 233
Healthco 237
Interdent 202
Kerr Canada 250
King Saud University 249
Kingston Business Systems 225
Kodak Canada 224
C. V. Mosby Co. of Canada 203
Procter and Gamble Inc. . . . . IFC
Rhone-Poulenc Pharma . . . 200, 219
Sask. Public Service Commission . . . 252
Teledyne Water Pic 196, 210
Tridont Dental Centres . . . 226, 227

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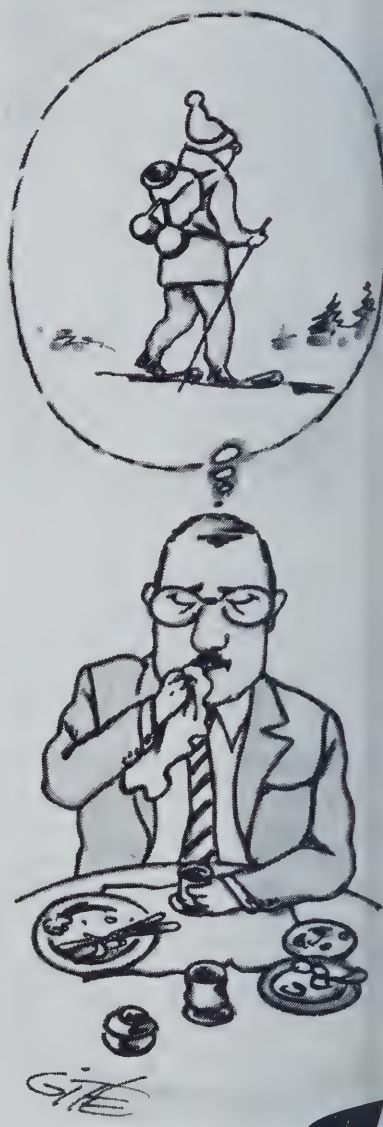

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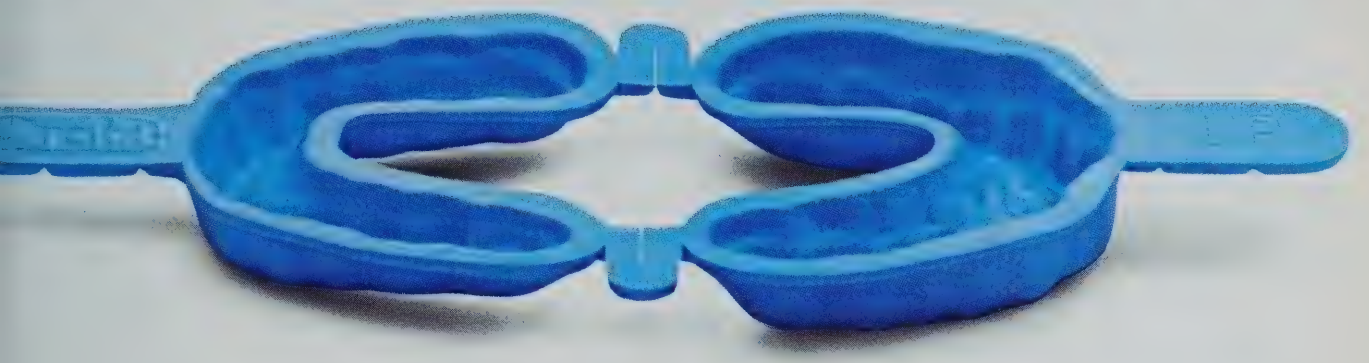

There's no argument that a fluoride treatment is one of the best ways to help prevent cavities.

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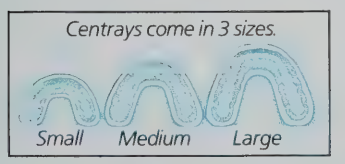

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For more information about the superior fluoride treatment, contact your Cooper representative.

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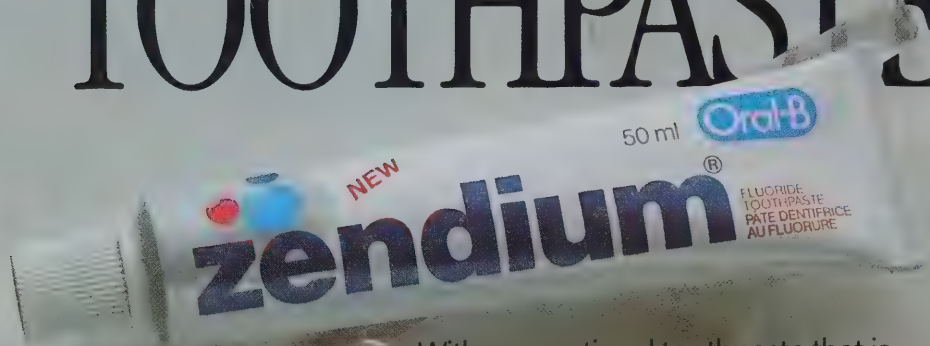

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So, in effect, it's just about everything a toothpaste could ever be.

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For more information, contact your Oral-B representative.

NEW ORAL-B ZENDIUM. THE TOOTHPASTE THAT HELPS PREVENT DEPOSIT BUILD-UP.

*Data available from Cooper Laboratories Ltd. upon request.

April/Avril 1984 Vol. 50 No. 4

CDA JOURNAL

Canadian Dental Association

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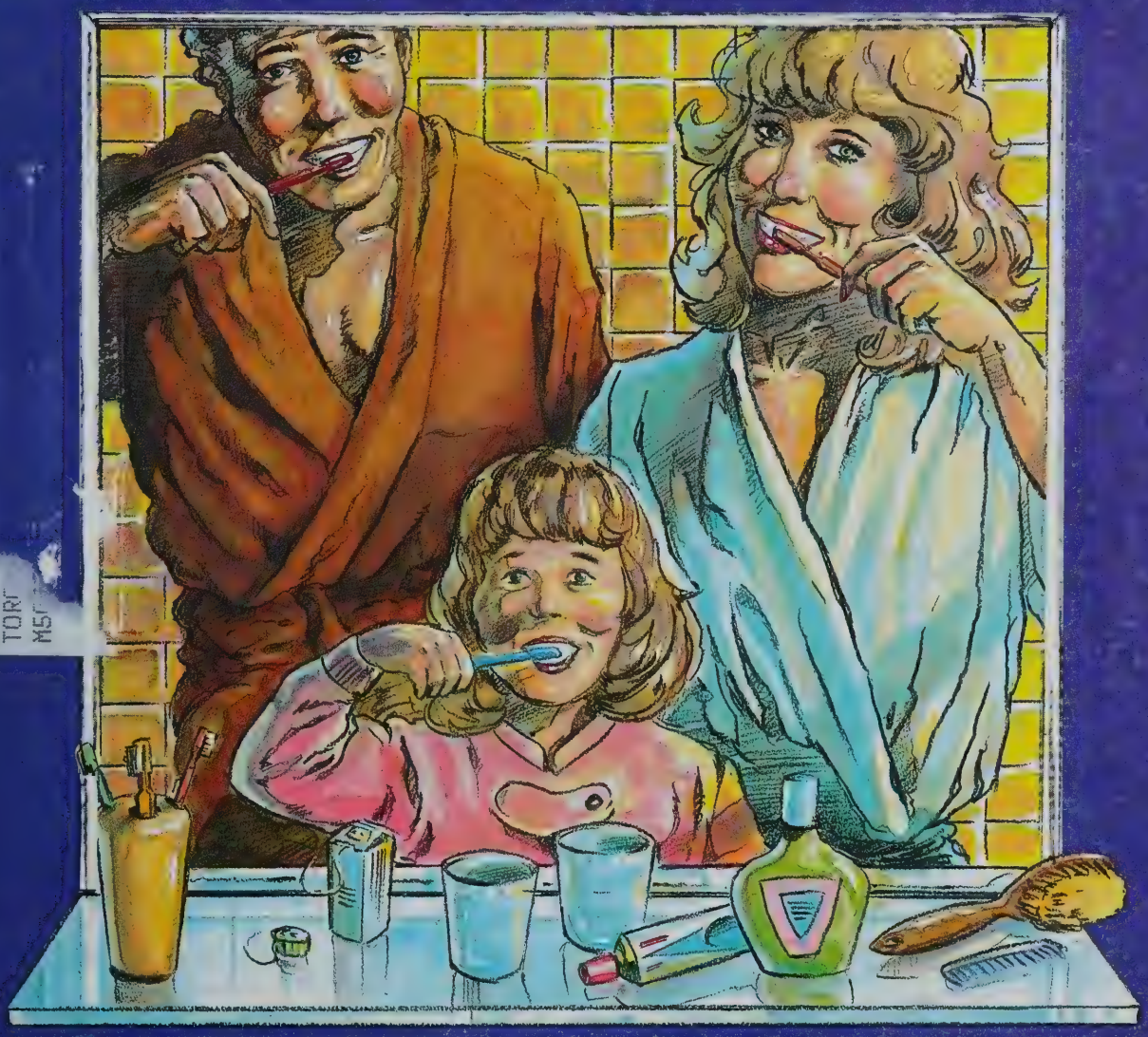

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Now, research has demonstrated that Crest's Fluoristat–which delivers the highest level of free fluoride in Crest's history[4]–penetrates tooth enamel and concentrates its fluoride in the decalcified white spot areas,[5] where it can hasten remineralization.

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CREST
Concentrates its power on the weak spots.

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"Crest contains sodium fluoride which is, in our opinion, an effective decay preventive agent, and is of significant value when used in a conscientiously applied program of oral hygiene and regular professional care."
CANADIAN DENTAL ASSOCIATION

References: 1. Ostrom, C.A. et al., J Dent Res, 56(3):212-221, 1977. 2. Arends, J., ten Cate, J.M., J Cryst Gro, 53:135-147, 1981. 3. Silverstone, L.M., Caries Res, 11 (Suppl. 1):59-84, 1977. 4. Data on file at Procter & Gamble, Inc. 5. Mobley, M.J., J Dent Res, 60(12):1943-1948, 1981. For further information, please contact Crest Professional Services, P.O. Box 355, Station A, Toronto, Ontario M5W 1C5

April/Avril 1984 Vol. 50, No. 4

JOURNAL

Canadian Dental Association
de l'Association Dentaire Canadienne

OPINION 256

National Dental Health Month Chairman, Dr. W. T. Koltek, says facing up to the rapidly changing world conditions is an exciting challenge.

NEWS UPDATE 257

Dental Health Series on Québec TV

A series of 13 half hour television shows is expected to reach more than 900,000 households in the Province of Québec.

Queen Honors Dental Officers

Colonels J. F. Begin and H. W. Brogan of the Canadian Forces Dental Services have been named honorary dental surgeons to the Queen.

Code of Ethics

The dental Code of Ethics, developed by the CDA, is published for the guidance of all member dentists.

BRIEFLY 263

Dental news items from across Canada and around the world.

LETTERS 269

The President of the Canadian Academy of Oral Radiology takes exception to "Guidelines for the Control of Radiation in the Dental Office," published in the JCDA in January.

CONTINUING EDUCATION 270

Courses being conducted during the next few months at several of the faculties of dentistry, and other locations, across Canada.

BOOK REVIEWS 277

Oral Premalignancy
Continuum II

CDA RESOURCE CENTRE 278

A list of articles from the CDA Resource Centre/Library on the subjects of Composite Resins and Dental Aesthetics.

ARTICLES 281

Interviews can be positive – by Paul McLaughlin
Inflation and your money – by Jim Garner

CFDE ANNUAL REPORT 287

The annual report of activities of the Canadian Fund for Dental Education is carried in this edition.

SCIENTIFIC

Symposium 25

CAN BASIC RESEARCH AFFECT CLINICAL TREATMENT OF DENTAL CARIES IN THE FUTURE? 305
Dr. J. Carlos
TRANSPOSITION OF TEETH 308
Dr. Axel Ruprecht et al.
AN EFFECTIVE ELIXIR FOR BEHAVIOURAL MODIFICATION OF THE CHILD DENTAL PATIENT 310
Dr. Gordon M. Jinks
ORAL COMPLICATIONS OF CANCER CHEMOTHERAPY 315
Dr. C. L. B. Lavelle et al.
VIOLATION OF SURGICAL PRINCIPLES IN PERIODONTAL FLAP SURGERY 320
Dr. V. Pruthi
MAUVAISE UTILISATION DE L'ÉLECTROCHIRURGIE: CORRECTION PAR GREFFE PEDICULÉE 325
Dr. Serge Roy

CDA RSP 264

OBITUARIES 282

ANNOUNCEMENTS 329

MARKETPLACE 331

ADVERTISERS INDEX 333

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ISSN0709 8936

IS A BRAVE NEW WORLD UPON US?

"Megatrend 1: We are in a 'megashift' from an industrial to an information based society. Megatrend 2: For every high technology action there must be a counterbalancing human response – high touch – where the technology is rejected. Megatrend 10: We no longer live in an either/or world; people have demanded and are getting a multitude of choices."[1]

"We live today in a globally interconnected world, in which biological, psychological and environmental phenomena are all interdependent. This ecological perspective or holistic world view with interrelated and interdependent phenomena is intrinsically dynamic."[2]

"The attitudes, thoughts and values that determine our perception of reality are going through a profound cultural transformation."[2]

It is a far different world we find ourselves thrust into than the one we entered out of dental school, 20 or even 10 years ago. How do we adapt to this rapidly changing world of globally interrelated phenomena and megatrends? The challenge goes far beyond reading the latest scientific literature, keeping up with technological and clinical advances or even trying to comprehend the latest strategic planning, marketing and management concepts. We can deny changes are taking place, become hostile or seek refuge in apathy. Or we may respond in a personal and individual way, seeking to accommodate this new reality without compromising our personal sense of integrity.

A dilemma? Perhaps. A challenge? Certainly.

This is National Dental Health Month. National and provincial programs are about to begin. Is there a better occasion to set up a personal (internal) dental health awareness program in light of the new reality the above authors tell us about? We can reconsider the purpose of dentistry and the role of the dentist in a rapidly changing world.

The purpose of dentistry can be to help people become healthy. Avram King defines health as "a quality of life which enhances an individual's capacity for enjoyment, satisfaction and achievement."[3] Our clinical accomplishments are an important means to this end.

Based on our care skill and judgement our restorations, root canals, . . . whatever, provide an opportunity for an enhanced state of health. But they are not the end purpose of dentistry. King has further pointed out that "affirming and enabling self" is a starting point to "affirming and enabling others"[3] to achieve health. Our role as dentists may be to enable this enhanced state of health in those who seek our services. Our role may also be to enable our patients to develop an attitude or philosophy of health that includes consciousness of the need for prevention and the importance of taking personal responsibility for health. To develop such a philosophy in others, we must ourselves have a firm, holistic concept of health.

Our professional training began with discipline in thought, behaviour and emotions, the synergism of mind, body and spirit. Is it not interesting that these elements of our professional training are totally congruent with what Capra describes as "necessary to achieve an ecological perspective."

Ours is the freedom to choose – how we use our discipline, how we view and treat those we serve. The answer lies within, we have only to look within. The future of our profession is self-determined. What an awesome responsibility but what an exciting one!

Dr. W.T. Koltek
NDHM Chairman
Winnipeg, Manitoba

1. John Naisbitt, Megatrends: The New Directions Transforming Our Lives.
2. Fritjof Capra, The Turning Point: Science, Society and the Rising Culture.
3. Avram King, Health Equals Wellness cassette program.

Editor's Note: The usual Editorial page has been superseded this month by a comment by this year's National Dental Health Month Chairman, Dr. W. T. Koltek of Winnipeg Manitoba. Dr. Koltek is of the opinion that National Dental Health Month is a good time for the dentist to begin his own personal and internal dental awareness program.

DENTAL HEALTH SERIES PRODUCED FOR QUÉBEC TV

All you ever wanted to know about dentistry is being provided for TV viewers in the Province of Québec through a series on a Québec educational cable channel.

A series of 13 half hour television programs was produced through the combined enterprise of the University of Montréal's dental faculty, the Order of Dentists of Québec and Télé Université, the educational TV channel.

Designed strictly for public education, the series, on various aspects of dentistry, was produced at the dental faculty at the request of the educational TV channel. The programs began in late January of this year and continue until the middle of April, which is National Dental Health Month. Produced entirely in the French language, the series is entitled "Dents d'aujourd'hui" and is expected to reach more than 900,000 households in the province.

According to Jean-Louis Fortin, Assistant Dean for continuing education at the University of Montreal's dental faculty, the series was prepared after Télé Université conceived the idea. A similar series on medicine had been produced at the University, but only for educational purposes for the edification of the medical profession.

"The purpose of the dentistry series was not continuing education for the practitioner, but to make more information about dentists, dentistry and dental health more accessible to the public," Mr. Fortin said.

The series has an interview format, with Michel Tremblay, a non-dental interviewer, talking to University of Montréal clinicians and professors about various aspects of dentistry. Employed for several years by le Féderation des médecins spécialistes du Québec, Mr. Tremblay is familiar with all aspects of medicine and dentistry.

Professors interviewed

"In all, 26 full-time professors and clinicians have been interviewed for the series, all on a voluntary basis," said Mr. Fortin, "In the beginning it was difficult to get the professors involved, but once we got one volunteer, the response was very good from faculty members."

Among those who volunteered their services in the interest of public education were such noted authorities as Dr. Alain Vaillancourt, Dr. William Donohue, Dr. Robert Dorion, Dr. Arto Demirjian and Dr. Pierre Desautels, who is also the Journal's French scientific editor.

"D'hier à aujourd'hui" is the title of the first program. Drs. Alain Vaillancourt and Leon Lemain discuss what dentistry was like in the past and what it is like today, including the most recent scientific advances and research. "Les Grands Ennemis" is a program on gum disease and dental caries, two of the public's greatest dental "enemies." "Les maladies de la bouche" with Drs. Monique Michaud and William Donohue, touches on such oral diseases as oral cancer and herpes.

"Se garder en santé" with Dr. Daniel Kendelman and Ms Monique Julien, discusses dental health, oral hygiene and nutrition. The program "Chez le dentiste" takes the viewer on a tour of the dentist's office with Drs. Denis Forest and Pierre Helie. Dr. Pierre Desautels talked to Mr. Tremblay about dental materials, including such restorative materials as dental amalgam and bridges. "Les prothèses dentaires" discusses dentures, with the focus on complete dentures. This program featured Drs. Pierre Duquette and Normand Brien. Teething and the care of baby teeth was the theme of another program, followed by an interesting look at the world of forensic dentistry with Drs. Robert Dorion and André Lauzon.

Program number 10, "Dents et croissance" with Drs. Arto Demirjian and Carole Lauzier, puts dental development in perspective with the development of the whole body. Anyone who have ever experienced a toothache could find out just what causes dental pain by tuning in to "La Douleur", featuring Drs. Hélène Lemay and Lise Laflamme.

One of the more specialty oriented programs in the series is "Les corrections majeures" which discussed major facial surgery, correction of congenital defects and orthodontics.

Only one specialty highlighted

"This show, with Drs. Claude Remise, Remy Dupuis and Claude Lamarche, is the only one in the series which deals specifically with a dental speciality — oral and maxillofacial surgery," said Mr. Fortin. "The other programs were designed to be informative, but easily understood, public education shows."

The last show of the series, shown the week of April 9 to April 15 will be on "L'équipe dentaire," which is a film on the dental team. The team includes the dental receptionist, dental hygienist, dental assistant, laboratory personnel and dental technician. The film illustrates how the whole team works with the dentist for the patient's dental health.

The programs are repeated on cable channels throughout the province of Quebec approximately 14 times a week.

"They are currently being shown on cable television stations in Montréal, Quebec City, Chicoutimi, Abitibi, Hull, Gatineau, Rimouski, Sherbrooke and Trois Rivières," Mr. Fortin told the Journal. "There are negotiations underway to have the programs run in five other areas of the province, including Sept Îles and the Gaspé." he said.

The series, which was videotaped using the Université de Montréal's on-site recording facilities, is also available on video cassette. The cassettes, which include all 13 programs, can be ordered from the Ordre des Dentistes du Québec, 3565 rue Berri, Suite 200, Montréal, Québec, H2L 4G3. They are available in either Beta or VHS video format. These cassettes will fill a need in many areas, according to Mr. Fortin.

Helpful in schools

"Many dental hygienists and schools lack this type of material on dental health. Dentists may also use them in their waiting rooms for patient education and the video

The poster advertising the television series emphasizes dental education and topics to be discussed.

Mr. Jean-Louis Fortin, Assistant Dean, Université de Montréal.

cassettes may also prove popular for use in dental clinics in hospitals.''

''This type of information, a promotion of dental knowledge, is important because many people are ignorant about dentistry in general,'' said Mr. Fortin. ''This is the age of the video and this type of program, using television as the medium will prove more popular with the public than a lecture series designed for educating the profession.''

The cassettes sell for $125. While the series is currently done only in the French language, Mr. Fortin is optimistic that the idea of doing a series in English may catch the imagination of another Canadian dental faculty.

''There was no cost at all to the faculty to produce the series and the fact that the guests were all volunteers from the faculty of dentistry made the series both inexpensive and relatively simple to produce. While the Université de Montréal has no plans to produce the series in English, maybe another faculty will take the idea and produce their own public education series for English Canada.'' he said.

At press time, the Journal was informed by Mr. Fortin that Radio Quebec the ''CBC'' in French Canada, had picked up the series, and was running it Sundays from 4 to 4:30 pm.

Mr. Fortin said that this network is broadcast not only in Quebec, but in many other provinces as well, which will give the series much greater exposure across Canada.

TWO CANADIAN FORCES DENTAL OFFICERS NAMED HONORARY DENTAL SURGEONS TO THE QUEEN

Colonel J.F. Begin, CD, DDS, DDPH, Director of Dental Treatment Services for the Canadian Forces at National Defence Headquarters, Ottawa, and Colonel H.W. Brogan, OMM, CD, DDS, Commanding Officer of 12 Dental Unit, Halifax, N.S. have been appointed Honorary Dental Surgeons to Queen Elizabeth II.

BGen James N. Wright, Director General Dental Services announced that the appointments were effective December 16, last.

Colonel Begin

Colonel Begin, who served on the Canadian Dental Association's Council on Health Care from 1976 to 1982, is a native of Moncton, N.B. He obtained his BA and DDS degrees from the University of Montréal in 1954 and 1959 respectively.

His military career began in the third year of his undergraduate training, in September 1957. Following graduation, he was posted to Québec City and then for a three-year period, to Goose Bay, Labrador (1961-64).

During his career, Colonel Begin has seen duty with 4 Canadian Infantry Brigade Group, Germany, at Canadian Forces Base, Winnipeg, and as an instructor at the Canadian Forces Dental School, following specialty training at the University of Toronto in 1970 in Dental Public Health. Further appointments included: Base Dental Officer, Canadian Forces Base St. Jean, Québec, 1972-76; Director, Dental Treatment Services at National Defence Headquarters from 1976-79, and Commanding Officer 15 Dental Unit from November 1979 to June 1982.

He assumed his present appointment as Director, Dental Treatment Services in 1982, and in this capacity is responsible for developing, coordinating and implementing policies and guidelines for treatment services, material requirements and procurement, financial administration and occupational health for the Canadian Forces Dental Services.

Colonel Begin is presently a member o the Conference of Provincial Secretaries an Registrars Authorities and a member of th Canadian and the Ontario Societies of Publi Health Dentists.

Colonel Brogan

Colonel Brogan, who was awarded th Queen's Jubilee Medal in 1977 and appoint ed a Member of the Order of Military Meri in 1979, was born in Minto, N.B.

He is presently responsible for denta services in the Atlantic Region of Canad and for the Canadian Forces' Nava Fleet.

While attending Acadia University i Wolfville, Nova Scotia, Colonel Broga served for three years with the Canadia Officers Training Corps, and was commis sioned in the Royal Canadian Infantr Corps. He later enrolled in the Regular Offi cer Training Plan and was graduated fron Dalhousie University in Halifax with hi DDS degree in 1961.

During his career in the Canadian Force Dental Services, Colonel Brogan has serve with the sea, land and air elements of th Canadian armed forces. His appointment have included Base Dental Officer at Cana dian Forces Base Borden, Ontario; Gage town, New Brunswick and Halifax, Nov Scotia. He commanded 35 Field Dental Uni and served as Command Dental Officer Canadian Forces Europe, from 1976-79. I December, 1979, he was appointed Com manding Officer 12 Dental Unit in Halifa with regional responsibility for denta services in the Atlantic Region and to th Canadian Fleet.

The two officers received the Queen' Cypher, gilt royal monogram insignia, wor on the uniform to indicate their roya appointments.

Colonel H.W. Brogan, right, seen receiving his Queen's Cypher insignia from BGen James N. Wright.

INTERNATIONAL DENTAL STANDARDS ORGANIZATION MEETING IN JAPAN

The International Standards Organization, concerned with the preparation of standards for dental materials, devices and equipment held very successful meetings in Niso, Japan during the week of November 21st-25th, 1983. The meetings were hosted by the Japanese National Standards Organization.

The various committee meetings were attended by 119 delegates from 14 different countries. Two delegates were present representing China for the first time at an international dental standards meeting.

The Canadian delegation consisted of Dr. Derek W. Jones of Dalhousie University who is Chairman of the Canadian Advisory Committee on ISO/TC 106, head of the Canadian delegation, member of the Secretariat and of Working Group 1; Dr. D.C. Smith of the University of Toronto who is Chairman of Working Group 1; Dr. Pierre Desautels of the University of Montreal; Dr. Ralph Barolet of the University of Laval; Dr. P. Williams of the University of Manitoba; Dr. L. Johnson of the University of Western Ontario and Mr. W. Latchem, *Beavers Dental Instruments*, who were delegates to the various working groups.

The Canadian delegation's funding is provided in part by the Canadian Dental Association, and all of the personnel of the above-named delegation with the exception of Mr. Latchem, are members of CDA's Council on Dental Materials and Devices.

Five working group meetings were held, 23 task groups as well as the plenary session of the Technical Committee. The various arrangements for the meeting were excellent, particularly the support given to the various secretariats of working groups.

Working Group 1 on Dental Filling Materials had three different task group meetings. This group had discussions on zinc oxide eugenol, polycarboxylate cements, resin based filling materials, and the harmonization of cement standards. Work is also continuing in the task groups on endodontic materials and pit and fissure sealants.

Working Group 2 on Prosthetic Materials had eight task groups meeting at this time. The task groups of Working Group 2 were involved with the development of standards for synthetic resin teeth, porcelain bonded to metal, resilient and soft lining materials for dentures, solders, alginate impression materials, gold casting alloys, denture base resin and corrosion tests. Working Group 3 on Terminology held meetings to develop standard terminology. Working Group 4, Dental Instruments, held meetings dealing with standardization of bur dimensions, neck strength and bur performance, a number coding system for rotary instruments, hand pieces and root canal hand instruments. Working Group 6 dealing with the workplace of the dentist and equipment held meetings dealing with the dental chair, dental units, dental lighting as well as dental amalgamators, dispensers and capsules.

At the final Plenary Session of the TC 106 meeting the French delegation proposed that Dr. Jones, Canada, and Dr. Stanford, U.S.A. should be nominated as liaison delegates (observers) representing ISO/TC 106 to the CEN/TC 55. This it was felt, should ensure a closer collaboration between the European standards organization and the ISO committee. It was hoped that this would minimize any differences in the philosophy and the types of standards developed by the two groups.

An important resolution was put forward concerning the date marking of products. This indicated that products should carry either a date of manufacture or when considered necessary, a date of expiry. This, it was suggested, should use the four digit ISO dating system, year and month. It was pointed out that there was a need to specify by means of letter or letters that fact that a particular date was an expiry date rather than the date of manufacture.

Canadian delegates have made a strong contribution to the work of ISO/TC 106. Canada is actively involved in all of the six working groups and the Canadian committee is not only involved in the development of test methodology based upon laboratory evaluations, but also heavily involved in the management and direction of the work programmes. This is particularly important when Canada is moving towards the establishment of a compliance testing programme. Involvement in the development and writing of international standards is also important to Canada since the majority of Canadian materials and devices are imported from abroad.

This report was Submitted by
Dr. Derek E. Jones, BSc, PhD, FI Ceram.
Chairman,
Canadian Advisory Committee ISO/TC 106
Chairman,
Canadian Standards Association Technical Committee on Dentistry
Secretariat ISO/TC 106/WGI

CDA MEMBER INFORMATION

Occasionally a CDA member makes us aware that he or she is not familiar with, or does not have convenient access to, a set of CDA guidelines, or a nationally accepted statement of policy or recommended procedures.

The CDA does its best to reach all members with such resource material because it must be readily available to be truly useful. Information of this nature is normally published for the benefit of all CDA members as soon as possible after the ratification of the document or policy.

Some documents and policy statements are significant enough to require periodic redistribution. One such important basic document is the CDA Code of Ethics, long since approved, but only recently circulated on a widespread basis to all members. It is published herewith for the guidance of all member dentists.

Code of Ethics
Preamble

Definition: A Code of Ethics is a set of principles of moral behavior which defines responsible conduct in specific professional situations.

Purpose: Society has given Dentistry the privilege of self-regulation. In return, Dentistry owes society responsible management of the profession. To this end, as professionals, it is necessary to adhere to a code of moral behavior which clarifies our responsibilities in our relationship with our patients, our colleagues and society at large.

Duty: The responsible dentist should be familiar with this Code, and the laws governing dentistry within the jurisdiction in which he or she practises, and should adhere to them.

■Principle One
Responsibilities to Patients

ARTICLE 1: Service

The dentist is a member of a health profession and has a duty of service to the public. This responsibility should include the delivery of quality care, competently and timely, within the bounds of the clinical circumstances, presented by the patient. Quality of care should be a primary consideration of the dental practitioner.

ARTICLE 2: Choice of Patient

Other than in an emergency, a dentist has the right to refuse to accept an individual as a patient. This notwithstanding, the dentist should not exclude, as patients, members of society on the basis of nationality, creed, race, color or sex.

ARTICLE 3: Expert Testimony

The dentist may provide expert testimony or opinion in a judicial or administrative action.

ARTICLE 4: Education

The dentist should keep his knowledge and skill current and should avoid undertaking treatment in which he lacks the expertise.

ARTICLE 5: Emergencies

The dentist has an obligation to make reasonable arrangements to provide for the treatment of a dental emergency.

ARTICLE 6: Guarantee

The dentist should not warrant or guarantee operations, appliances or treatment; however this in no way negates the dentist's responsibility to provide the highest standard of care.

ARTICLE 7: Explanation and Estimate

The dentist should advise the patient in understandable terms the kind of treatment he recommends and should provide the patient with an estimate of the fees for such treatment.

ARTICLE 8: Records

Records of medical-dental history and the diagnosis and treatment of each patient should be maintained. Such records or information may be shared with a confrere with the patient's permission.

ARTICLE 9: Secrecy

Information of a professional or personal nature between a dentist and patient, should be kept in strict confidence except as required by law. A dentist should caution his staff on the importance of professional secrecy.

ARTICLE 10: Arrangements for Alternate Treatment

A dentist having undertaken the care of a patient should not discontinue his service without first having given notice of his intention, but he should endeavor to arrange for continuity of treatment.

ARTICLE 11: Consultation and Referral

The dentist should seek consultation, if possible, whenever the welfare of the patient will be safeguarded or advanced by utilizing those who have special skills, knowledge and experience.

When a patient visits or is referred to a specialist or consulting dentist for consultation/treatment, the specialist or consulting dentist, upon completion of his care should return the patient, unless the patient wishes otherwise.

When there is no referring dentist the specialist should inform the patient when there is a need for further dental care.

ARTICLE 12: Auxiliaries

The ultimate responsibility for the patient's treatment by auxiliary personnel is the dentist's.

ARTICLE 13: Collection of Fees

The dentist is entitled to collect his fees and may utilize any legal method of doing so. On the patient's request the dentist should render him an itemized statement.

ARTICLE 14: Fee Splitting

Dentists should not split fees for the referral of patients.

ARTICLE 15: Third Party Fees

Dentists should not increase fees solely because a patient is covered by a third-party reimbursing agency.

■ Principle Two

Responsibilities to the Profession

ARTICLE 1: Mutual Support

Society provides the Profession the opportunity to regulate itself. Such regulation is achieved largely through the influence of the professional societies. Every dentist, therefore, has the dual obligation of making himself a part of a professional society and of observing its rule of ethics.

ARTICLE 2: Criticism

Dentists should refrain from making any disparaging comments to patients or the public about the qualifications or procedures of a colleague: rather, such criticism should be directed to the appropriate professional body.

ARTICLE 3: Use of Professional Titles and Degrees

In presenting himself to the public, a dentist should do only those things which will present him as an equal of his professional colleagues, except as he may be duly qualified to practise as a specialist in his jurisdiction.

ARTICLE 4: Advertising

Dentists should build their professional reputation on their ability and integrity. The manner of signs, announcements, stationery and other forms of advertising, considered proper and in the best interest of the public and profession, are currently prescribed by Federal and Provincial legislation and a dentist should conduct himself accordingly.

ARTICLE 5: Contractual Services

The dentist, by entering into a contract with an organization or other party involving the practice of dentistry, neither reduces his personal professional responsibilities nor transfers any part of these responsibilities to that organization or other party.

ARTICLE 6: Group Dental Practices

When a dentist is a member of a group-practice he should practise under his own name, and maintain his own professional responsibility.

ARTICLE 7: Incorporation

A dentist or a group of dentists may practise as a corporation if permitted by provincial law.

ARTICLE 8: Patents and Copyrights

The dentist has the obligation of making the fruits of his discoveries and labors available to all when they are useful in safeguarding or promoting the health of the public. Patents and copyrights may be secured by a dentist provided that they and the remuneration derived from them are not used to restrict research, practice, or the benefits or the patented or copyrighted material.

ARTICLE 9: Lending of Name

A dentist should not lend his name or written testimonial whether for reward or not, to any medical, surgical or dental appliances or apparatus or any drug or medicinal or dental preparation or material which is sold or given to the public.

Open to Canadians

ADA PERIODONTAL HEALTH AWARD

The American Dental Association through a grant from the Proctor & Gamble Company, has established the annual ADA Periodontal Health Award. The program begun in 1983, and open to Canadian dentists and dental personnel, recognizes those who have contributed new methods to improve the prevention, diagnosis and treatment of periodontal disease and those who have contributed to a greater public awareness of periodontal health needs.

Entry rules are as follows:

1. Any program that can result in improved periodontal health is eligible. This may be a program that increases awareness by the public of the condition and thereby leads individuals to seek preventive measures, diagnosis or treatment. It may be a novel program or technique in the dental office that facilitates periodontal disease prevention, diagnosis or treatment.

Basic scientific breakthroughs in understanding periodontal disease are recognized and honored by the dental research community. This award is to focus attention on procedures and means by which public awareness of periodontal disease may be heightened and the effectiveness of prevention, diagnosis and treatment is enhanced.

2. Eligibility is not limited to dental personnel. Any individual or organization responsible for creating and implementing a program concerned with some aspect of periodontal health may submit an entry.

3. All entries must be accompanied by a signed entry application. All entries must be acknowledged on the application by a provincial or local dental society, a dental school or a provincial dental director. The acknowledgement should not be made by the individual submitting the entry.

4. All entries must be postmarked no later than **May 15.**

5. All entries must be accompanied by a one-page outline, including a description of

he entry's contents and a summary of the program. In addition, entries may include any documentation necessary to illustrate the program to the judges, with the following limitations:

- Audiovisuals must be limited to those specified in guidelines attached to the entry form. Audiovisuals must be accompanied by a typed outline and/or a transcript of their contents.
- Job descriptions and "past records" of individuals should not be submitted.

5. Entries will not be returned, except for audiovisuals.
7. No entry that duplicates an applicant's previous entry will be accepted.

Evaluation criteria

Criteria for evaluation of the entries include: documented effectiveness, scientific credibility/accuracy, originality, usefulness in the private dental office, potential number of persons served, and completeness of the entry.

Some examples of the entries that may be considered are as follows:

Public service advertising, poster campaigns, school programs, diagnostic aids for patient education or measurement of progress, prophylactic procedures, unique instruments for periodontal treatment, oral hygiene aids, or audiovisual aids for instruction in the dental office.

$2,000 first prize

The first prize is $2,000. Awards of $300 may be granted for other meritorious entries.

Judging will be conducted by the ADA Council on Dental Health and Health Planning, its consultants and staff. The judges' decision will be final.

Award winners will be announced in the summer, when judging has been completed. Presentation of the $2,000 award will be made during the ADA annual session in Atlanta, Georgia, Oct. 20-25.

Applications

Applications are available from: ADA Periodontal Health Award, American Dental Association, Suite 1704, 211 East Chicago Avenue, Chicago, Illinois, 60611, U.S.A.

DR. JOHN HARDIE NAMED BY CDA TO NATIONAL AIDS ADVISORY GROUP

Dr. John Hardie, BDS, MSc, Chief of the Department of Dentistry, Ottawa Civic Hospital, Ottawa, Ontario, has been named CDA's liaison to the National Health and Welfare Department's new National Advisory Committee – AIDS (NAC-AIDS).

Dr. Hardie, a member of the Canadian Dental Association's Council on Hospital Services, was named by CDA President Dr. Robert N. Hicks.

Mme. Monique Bégin, federal health and welfare minister, invited the CDA to provide input, and Dr. Hardie, an oral pathologist who also serves as Clinical Associate Professor in the Department of Pathology at the University of Ottawa, was nominated.

National resource base

Mme. Bégin has informed the CDA that "the mandate of the new committee will be to provide resource base for information and coordinated activities, through its interaction with provincial advisory committees and health departments, as well as other AIDS study groups. It will also make recommendations and furnish me with appropriate advice for the management of AIDS in Canada."

The groundwork was laid in May, 1983, when a task force of scientists from the provinces, universities, hospitals and the federal government, was brought together under the sponsorship of the health and welfare department to discuss the problem of AIDS. Later, Mme. Bégin formed that task force into the present National Advisory Committee.

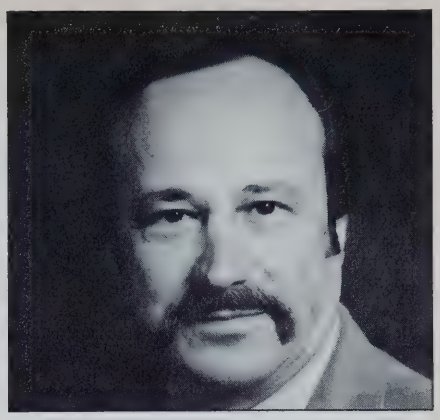
In thanking the CDA for the appointment, Mme. Bégin noted that because Dr. Hardie was already well known to the national health and welfare department's Laboratory Centre for Disease Control personnel, "direct communication on oral pathology related to AIDS, would therefore appear to be facilitated through these direct channels."

Author of JCDA article

Readers of this Journal will recall a definitive article on the subject of AIDS written by Dr. Hardie: *Aids and its significance to dentistry*, published in August of 1983 – JCDA Vol. 49: No. 8; 565-569.

Dr. Hardie is also involved in organizing the scientific program for the 1985 national convention of the CDA, which will be held in Ottawa.

Dr. John Hardie



Dr. Ted Hechter

DR. TED HECHTER INSTALLED AS PRESIDENT OF THE MDA

Dr. Ted Hechter of Winnipeg was installed as the new president of the Manitoba Dental Association at the 100th annual meeting held February 3-4, in Winnipeg.

A 1960 graduate of the University of Alberta, Dr. Hechter has been in private practice in Winnipeg since that time.

He has served the MDA as chairman of the Mediation and Peer Review, Manpower and Distribution, Dental Health Month and Geriatric Committees. He has also lectured part time on the clinic floor of the Faculty of Dentistry, University of Manitoba.

Dr. Hechter has been a member of the MDA Board for two years and is a past president of the Winnipeg Dental Society.

Board members

Other MDA Board members installed by Dr. Gene Solmundson, a past president of the MDA, are: Drs. Les Allen, vice-president: John Dillon, past president; and directors Ernie Cohen, Bryan Pearson, Joe Stasiuk and Orville Heschuk. (Drs. Stasiuk and Heschuk are from Portage la Prairie and Dauphin, respectively. All the others are from Winnipeg). Dr. Harvey Short was named Minister of Health appointee, and Ms. Sandra Ross, a Winnipeg hygienist, will serve as auxiliaries representative.

CDA President speaks

During the annual meeting, Dr. Robert N. Hicks, President of the Canadian Dental Association, provided MDA members with an update on current audits being conducted in dentists' offices by Revenue Canada, to determine the tax position of management companies.

New life members

Five members of the Manitoba Dental Association were awarded Life Memberships. Drs. W.V. Grenkow, H. Kahanovitch, A.L. Rothstein, D.J. Shapira and H.H. Short, all of Winnipeg, were so honored.

INSTRUCTIONAL VTR PROGRAMS AVAILABLE TO CANADIAN DENTISTS

The Chicago Dental Society has announced its recent affiliation with the Great Plains National Instructional Television Library (GPN) for the distribution of its premier television programs produced and shown live at the CDS Midwinter Meetings.

The programs, presented by outstanding clinicians, have been recorded and prepared for the self-instruction and continuing education of practitioners and dental groups.

Canadian dentists may obtain the programs through the University of British Columbia. The contact is Dr. Malcolm F. Williamson, Assistant Dean and Director of Continuing Dental Education, 105 2194 Health Sciences Mall, Vancouver, B.C. V6T 1W5.

The educational package includes a detailed study guide, current references for further reading and test questions that may be answered by the viewer to receive credit for participation. The study guides are an important component. They are developed by faculty specialists from the University of Nebraska College of Dentistry.

Twenty-four individual programs are presently available on video cassettes. TV programs taped at the Chicago Dental Society Midwinter Meetings on February 19-22 will be released by May 1.

The 1984 topics include: "Current Diagnostic and Treatment Procedures for TMJ Dysfunction," by Dr. Harold Gelb; "Endodontic Update," by Dr. Noah Chivian; "Simple, Fast, High-Quality Fixed Prosthodontic Procedures," by Dr. Gordon Christensen; and "Periodontal Therapy in General Practice," by Dr. Surindar Bhaskar.

Paul Schupbach is the Director of Great Plains National, which is the repository for all television programming recorded at the Chicago Dental Society's Midwinter Meetings since 1966. Dr. Robert Wood of the University of Nebraska College of Dentistry is the professional consultant and program editor.

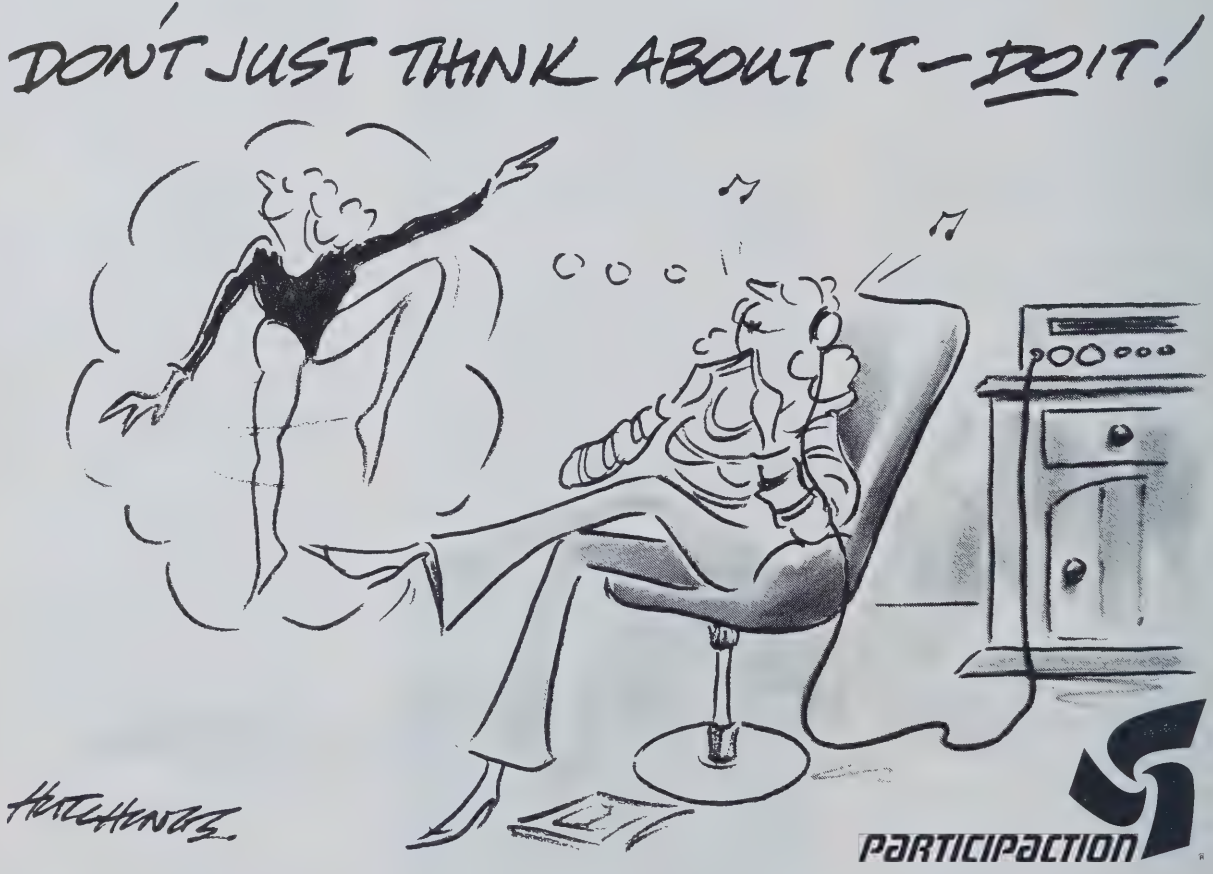
CFDE RECEIVES RECORD SUPPORT FROM DENTISTS

The Canadian Fund for Dental Education's total income for 1983 was $258,906 according to figures recently announced by board chairman Dr. David K. Peters.

There was a record level of support from both dentists ($79,861) and business and industry ($86,551) during the past year. Dental organizations gave $13,358 and living memorial donations of $9,427 helped to create the outstanding 1983 total, Dr. Peters noted. Also, a contribution of $8,22 from the *Rhône Poulenc Pharma Inc.* firm was very helpful.

"We are deeply grateful to everyone who supported our many programs to promote good dental health," Dr. Peters said.

(A detailed financial report appears elsewhere in this edition of the Journal).



Briefly

Dr. Ed O'Brien of Vancouver offered his services to the Boy Scouts during two major Western Canada scouting events in 1983 and found his hands very full.

The 15th World Jamboree was held in Calgary in July/83 and 14,000 young people from 102 countries attended. In August, the fourth British Columbia gathering numbered about 2,000 boys. Using a dental van loaned by the B.C. government, Dr. O'Brien saw more than 350 patients during the World Jamboree and about 50 at the B.C. event.

He noted with interest the differences in dental needs of young people from various countries around the world. The North American patients' major problem was loose orthodontic wires. European visitors needed most of the "open-and-drains." Nearly all the extractions were for patients from Third World countries, who presented him with unsalvageable teeth.

Dr. O'Brien notes that "the facility was kept very busy from 8 a.m. to 8 p.m. seven days at week" (at the World Jamboree). He said the event was one worth remembering. "I wouldn't have missed it, although it was nice to get home and work with trained assistants and shorter working hours."

Another Tri-Dont Dental Centre is scheduled to open in the St. Vital shopping centre in Winnipeg in May. This will be a seven days a week, no appointment necessary, service, according to a recent announcement made by Dr. Howard Rocket, co-founder of the three-year old group of 41 Canadian and three Florida shopping centre clinics.

Three members of the University of Western Ontario's Faculty of Dentistry were in Chile late last year to give courses during the Seventh International Congress of Odontostomatology.

Drs. R. E. Jordan, M. Suzuki and J. E. Stakiw were invited speakers for the congress, held in Santiago, Chile. They each gave a two day course to pre-congress registrants and were also asked to lecture at the University of Chile, Faculty of Dentistry.

Six members of the Canadian dental community were inducted into the International College of Dentists at the most recent meeting of the Canadian Section. They are: Dr. Sheldon M. Claman, oral and maxillofacial surgeon and former president of the Royal College of Dentists of Canada, of Winnipeg; Dr. Douglas A. Eisner, orthodontist, former councillor of the RCD (C), of Halifax; Dr. John S. Little, orthodontist, presently a councillor of the RCD (C), of Edmonton; Dr. Guy Maranda, oral and maxillofacial surgeon, an RCD (C) examiner, of Québec City; Dr. Marshall Peikoff, endodontist, RCD (C) councillor and examiner, of Winnipeg, and Dr. John W. Stamm, public health dentist, Examiner-in-Chief, RCD (C) and a member of the College's executive committee, of Montréal.

Dr. Robert Rapp, Professor and Chairman of Paedodontics, University of Pittsburgh, recently was presented with the Award of Excellence at the annual meeting of the Pennsylvania Society of Dentistry for Children.

This award recognizes his "performing with distinction in the field of Paedodontics in the areas of research, teaching, administration, practice and publication."

Dr. Rapp is a former president of the Canadian Society of Dentistry for Children and is currently vice-president of the International Association for Dental Research.

A new battery-powered electronic device called the Vanguard, is gaining popularity in some American dental practices, as a means of pinpointing hidden or forming cavities.

It is able to indirectly measure demineralization at any spot on the biting surface of a tooth. Normally a tooth has high resistance to an electric current, but where decay is present, either minuscule or advanced, moisture replaces the eroded enamel, and thus creates a better conductor. The device emits a painless low-voltage current to pinpoint these points of decay.

Some of the models are attracting the attention of paedodontists, because they record the findings on a screen as a big smile, if no evidence of caries is found, or a frown if obvious decay is detected.

Children, the users say, find the device both instructive and entertaining.

Erratum

It has been drawn to the attention of the editors that the name of one of the periodontists conducting Ontario Dental Association continuing education courses in periodontics in Toronto in April, was misspelled. The name Dr. "Pierson", in the January JCDA Continuing Education listings should have been "Pearson." He is Dr. Gerald E. Pearson, BSc, DDS, Dip. Perio., a periodontist practising in Willowdale, Ont. We regret any confusion this may have created.

The Nova Scotia Dental Association is presenting a brief on dental manpower in the province to a provincial Royal Commission on Post-Secondary Education, in the near future.

According to Don Pamenter, Executive Director of the NSDA, the brief addresses the past and present dental manpower situation in Nova Scotia and will also provide a look into the future for dental students in the province.

The brief will be used for information purposes only by the Commission, and it was not expected at press time that NSDA representatives would have to appear at a public hearing.

The Royal Commission was formed over a year ago to study the various aspects of post-secondary education in Nova Scotia. Public hearings have been held throughout the province on many aspects of education since the Commission was organized.

One of the Nova Scotia Dental Association's longest serving members retired last month.

Dr. S. G. Bagnall, who began his career at the NSDA in 1972, had the combined responsibilities of Executive Director for the Association and Registrar for the Provincial Dental Board of Nova Scotia from that time until 1980. In 1980, Dr. Bagnall relinquished his role as Executive Director, but continued to serve as Registrar until his retirement.

The Newfoundland provincial department of health has reorganized the province's dental services program, splitting it into two distinct sections.

A new division of community dentistry has been created. The public health aspects of the dental services program and the childrens' dental health program have been separated and community health activities of the dental services division will now be handled by the public health branch of the department.

Dr. Sharat Doshi will head the new division of community dentistry. He has been with the province's dental services division for the past seven years. The new division

will focus on preventive dental health measures.

Cutbacks in health care costs and internal efforts by hospitals to cut their own budgets are limiting facilities for oral surgery procedures in Newfoundland, according to Dr. Jim Miller, the only oral surgeon in that province.

Dr. Miller told the Royal Commission on Hospital and Nursing Home Costs that hospitals in Newfoundland had severely reduced the operating time available to him and general dentists. Patients must either get on a long waiting list or travel outside the province for oral surgery, he said. He believed that the matter was more than just a matter of cost-cutting and that the hospitals themselves should be able to do more to alleviate the situation.

He said that for some years, the Newfoundland Dental Association has mounted a campaign to get a well-equipped clinical facility for oral surgery, but this has not yet materialized. One well-equipped operating room for oral and dental surgery could be kept busy five days of the week just for oral and dental needs of handicapped adults, Dr. Miller told the Commission.

A major international conference addressing the multiplicity of problems that are encountered with patients who have suffered injuries to the mouth, is scheduled to take place in Dallas Texas, November 8-10.

The International Conference on Oral Trauma, sponsored by the American Association of Endodontists Endowment and Memorial Foundation, will address the state of the art in the management of oral traumatic injuries. the event will be of vital interest to general dentists, endodontists, paedodontists, oral surgeons and periodontists.

Some of the clinicians who will be on hand for the occasion will be: Drs. Frances Andreasen, Jens Andreasen, Miomir Cvek, George Zarb, Stephen Moss, Ingeborg Jacobsen, Duane DeVore, Robert Walker, Raul Cafasse, Leif Tronstad and Andrew Michanowicz.

The Conference will be held at the Registry Hotel in Dallas, Texas.

Dentists in Florida have joined forces with parents, civic groups, police and many volunteers to help prevent the kidnapping and abduction of children.

Child Keyppers Inc., a non-profit organization was formed a year ago in an effort to prevent child abduction or to find and identify lost children in the state. The program, the first of its kind to include the use of dental charting, is being considered for use as a national U.S. pilot program on child abduction prevention.

The program will aid Florida authorities in plugging into the National Crime Information Centre (NCIC) which is a crime information centre in Washington D.C., operated by the FBI. Childkeyppers Inc. is developing a record information data system designed to feed information into NCIC's computer.

Vital statistics on children are provided by parents at local "Safety Days" put on by the organization. These statistics, such as height, weight, complexion, distinguishing marks and personality are detailed on a form which includes a streamlined dental chart of the child concerned. The chart, developed by retired Florida dentist, Dr. Richard Galeta, is especially coded for use by NCIC's computer. The charts might help identify lost, injured or dead children.

"We hope the information will never have to be used to identify a dead child, but even if a child is unconscious or disoriented, the information in the computer can be used to identify him," said Dr. Galeta.

"The ongoing cooperation of parents in updating children's dental records is critical to the computerized operation. Dental records must be kept current to aid in identification," he said.

Several hundred Florida children have already been charted through the program.

The American Dental Association recently approved a program of day-long nutrition seminars for practicing dentists and their staffs.

The seminars will begin in May and will be presented at five dental meetings around the United States.

The purpose of the program is to provide some accurate information, including emphasis on common nutrition fads and myths about diets and nutrition. This information will enable dentists and their staff members to dispense good dietary information to their patients in their day-to-day practice.

The seminars, which were approved by the ADA Council on Dental Health and Health Planning, will be free of charge.

More than 4,000 physicians, dietitians, nutritionists, dentists and other health care professionals took part in the first international videoconference on food, fitness and health staged on Friday, March 30 in a Los Angeles television studio.

The three-hour seminar was broadcast live by satellite to 30 cities across the United States and Canada.

Speakers included Jack Wilmore PhD, professor in the Department of Physical Education, Exercise and Sports Sciences Laboratory at the University of Arizona; Peter Wood, PhD, deputy director of the Stanford Heart Disease Prevention Program, and Nancy Clark, MS, RD, sports nutritionist and author of *The Athlete's Kitchen*.

Also participating were: David Costill, PhD, director of the Human Performance Laboratory at Ball State University; Stanford's William Haskell, PhD, the current president of the American College of Sports Medicine, and Judith Stern, ScD, RD, professor, Department of Nutrition, University of California at Davis, and director of the Food Intake Laboratory Group.

Topics included: metabolism, interaction between food intake and physical activity, optimal weight, and the comparative nutritional needs of high performance athletes, everyday exercisers, and occasional sports participants.

Several of the speakers discussed athlete's sodium, potassium and iron needs, calcium losses in female athletes, and the rôle of exercise in preventing bone mineral loss.

At each location, seminar participants viewed the program on a large screen TV, and, through a two-way audio system, were able to question the experts and add their own comments.

CDA Retirement Savings Plan

Unit values of the Canadian Dental Association's Retirement Savings Plan stood as follows on February 29, 1984.

Common Stock Fund	$75.48881
Fixed Income Fund	$38.26356
Guaranteed Fund	$27.84827
Balanced Fund	$15.29073

Total assets (market value) of the plan were $38,098,979.

The previous month's figures, as of January 31, 1984, stood as follows:

Common Stock Fund	$76.68535
Fixed Income Fund	$38.38071
Guaranteed Fund	$27.69839
Balanced Fund	$15.53002

Total assets (market value) of the plan were $38,404,075.

For further information write to: Canadian Dental Service Plans Inc., Ste. 600, 2 Lansing Square, Willowdale, Ontario M2J 4Z3 or call the central information services of CDSPI at 1-800-268-5418 (toll free number for Western Canada, Atlantic Canada and Ontario for Code 807 only, 1-800-268-3411 (toll free number for Quebec and Ontario except Code 807), and 497-7117 (Metro Toronto area).

FÉDÉRATION DENTAIRE INTERNATIONALE MEMBERSHIP

Membership in the Fédération Dentaire Internationale for 1984 is now open for new or renewed membership. Supporting membership from Canada and attendance at the Tokyo Congress was significant and it is hoped that such support will continue. After the March 1984 issue, only those who renew their membership will continue to receive the Newsletter and in addition, it is necessary to be a supporting member to attend the outstanding Congress planned for Helsinki, Finland on August 25-31, 1984.

Registrants to FDI world congresses must be supporting members of the Federation. To be eligible for supporting membership, Canadian dentists must be members of the Canadian Dental Association.

The subscription fee is $35 (Canadian) or in combination with a subscription to the International Dental Journal $60 (Canadian). We urge you not only to become a member but to encourage your colleagues to join as well.

Your membership fee is your contribution in support of FDI in its efforts to promote improved dental health on a worldwide basis in direct exchange of scientific knowledge and expertise. A portion of the fee will also be used by the CDA to offset administrative expenses associated with the FDI membership program.

Please return the attached form with your remittance without delay to the Canadian Dental Association, 1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6.

CANADIAN DENTAL ASSOCIATION

1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6

MEMBERSHIP APPLICATION FÉDÉRATION DENTAIRE INTERNATIONALE

— To develop contacts with dentists from around the world

— To be part of your profession's voice in the international community

— Fees include administration cost, U.S. premiums, CDA representation to FDI

_____ $35 FDI Supporting Membership will receive the Quarterly FDI Newsletter and Membership Card

_____ $60 FDI Supporting Membership and Subscription to International Dental Journal

NAME _____ ADDRESS _____

THIS IS NOT A LICENCE FEE, this is your remittance for annual supporting membership.

Please return this form with your remittance payable to CDA. A receipt and membership card will be issued.

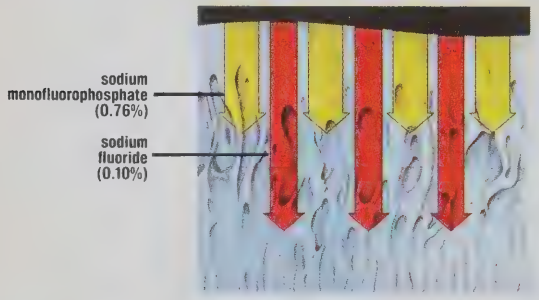
How Colgate's two fluoride formula achieves more complete remineralization resulting in nearly double the cavity protection of a single fluoride formula*.

A major role of fluoride in cavity prevention is to accelerate the process by which demineralized enamel is rebuilt.[1-4] This reverses white spot lesions which would otherwise become cavities.

Today's Colgate is the first toothpaste with two fluorides—sodium monofluorophosphate at 0.76% and sodium fluoride at 0.10%. Their differing molecular structures mean that these fluorides may work in different ways in tooth enamel. The result at these concentrations, is more complete remineralization of white spot lesions than either can achieve alone.

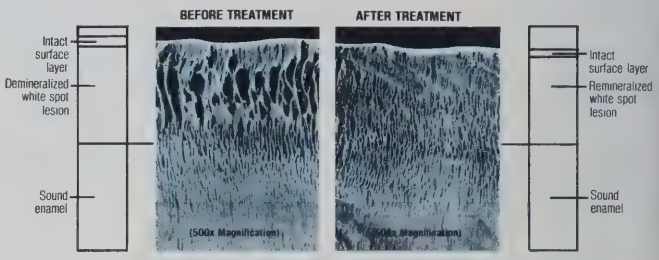
Why these two fluorides remineralize more completely.

It has been postulated that fluorides reach white spot lesions by penetrating enamel through the interprismatic spaces. Sodium monofluorophosphate, being a larger molecule, reacts with enamel primarily at the surface of a white spot lesion. Sodium fluoride, a smaller molecule, penetrates deeper into the lesion.



Working at different levels, the two fluorides may complement each other, enhancing remineralization over a greater area of the lesion than a single fluoride* alone.

This complementary action means more fluoride is available to enhance remineralization over a greater depth of the lesion, than is provided by either fluoride alone.[5,6]



This more complete remineralization has been demonstrated in laboratory studies,[7] and can be seen in the following photomicrographs above.

Clinical studies show nearly double the cavity reduction.

Colgate with this two fluoride concept was tested in a three year clinical study.[8] The results—Colgate's two fluoride formula provided 27.0% reduction in new caries versus 13.8% for the single fluoride positive control* (DMFT).

Conclusion.

Colgate's two fluoride formula provides superior cavity protection to a single fluoride formula*: *Only Today's Colgate has a two fluoride formula.*

When you recommend Colgate you're recommending an innovative product—offering advanced and clinically tested cavity protection.

***Sodium monofluorophosphate (0.76%)**

REFERENCES

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8. Hodge, H.C., et al, Brit. Dent. J., **148,** 201-204, 1980.

†"Colgate Toothpaste contains sodium monofluorophosphate and sodium fluoride which are, in our opinion, effective decay preventive agents and are of significant value when used in a conscientiously applied program of oral hygiene and regular professional care. Canadian Dental Association

PARTNERS IN PREVENTIVE DENTISTRY.

An important matter of judgement

Weigh the evidence[1-13]

There are few, if any, therapeutic decisions made more frequently than those involving so-called simple analgesic/antipyretic drugs. There are two basic choices. The decision can have far-reaching implications for many patients and also determine the efficacy of concomitant therapy.

ACETAMINOPHEN		ASA
	AT LABEL DOSAGE	
	EFFICACY	
equipotent	**ANALGESIC**	equipotent
equipotent	**ANTIPYRETIC**	equipotent
not indicated	**ANTI-INFLAMMATORY**	required dosage generally exceeds analgesic/antipyretic levels and regular administration is necessary — lesser or intermittent dosage is ineffective
	SAFETY	
hypersensitivity in rare instances	**ADVERSE EFFECTS**	GI bleeding, ulceration, nausea, vomiting, diarrhea, vertigo, tinnitus, hearing loss, pruritus, urticaria, angio-edema, anaphylaxis
slight increase in prothrombin time for patients on oral anti-coagulants but generally clinically insignificant	**PRECAUTIONS**	history of GI ulcerations, bleeding tendencies, anemia or hypoprothrombinemia; patients with asthma or other allergic conditions; concomitant use with anticoagulants, uricosurics, other non-narcotic analgesics, hypoglycemics, alcohol, methotrexate.
none, except rare hypersensitivity	**CONTRAINDICATIONS**	salicylate sensitivity, active peptic ulcer
no known risk	**IN PREGNANCY**	risk of anemia, hemorrhage, delayed or prolonged labour, increased risk of intracranial hemorrhage in premature infants, premature closure of the ductus arteriosus
no specific risk	**IN CHILDREN**	specific risk of intoxication using therapeutic dosage in febrile and dehydrated children
rare equivocal reports of reversible liver function abnormality at high dosage	**HEPATIC TOXICITY**	reversible hepatitis in apparent risk groups at high dosage
equivocal	**ANALGESIC NEPHROPATHY**	equivocal
oral anticoagulants (as above) chloramphenicol (increased half life)	**DRUG-DRUG INTERACTIONS**	oral anticoagulants, uricosurics, non-steroidal anti-inflammatory agents, oral hypoglycemics, corticosteroids, ethyl alcohol, methotrexate
	ACUTE OVERDOSE	
potentially serious	**CLINICAL RISK**	potentially serious
supportive management and/or specific antidote (N-acetylcysteine)	**TREATMENT**	supportive management — no specific antidote

References listed in brief prescribing information

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acetaminophen

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See prescribing information on page 333

TAKE NO CHANCES WITH YOUR PATIENT'S SENSITIVE TEETH

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THE NO.1 TOTAL THERAPY FOR HOME TREATMENT OF SENSITIVE TEETH

UNSURPASSED CLINICAL EVIDENCE:

Over 13 years of clinically documented efficacy has made Sensodyne the dentifrice of choice of 92% of all dentists.

Composite clinical findings confirm that Sensodyne is highly effective as a dentifrice that cleans teeth and soothes pain.

HIGH DEGREE OF EFFICACY

- Positive therapeutic gain in 9 out of 10 patients
- Complete remission of pain in 2 out of 3 patients
- Early onset of relief — often in less than a week *(Sensodyne's effectiveness starts with the first brushing and builds up with continued use)*

PROVEN SAFETY *in over 20 years of widespread dental use*

- Comparable abrasion levels — no damage to enamel or dentin *(RDA tests have shown Sensodyne compares in abrasivity to other leading toothpastes.)*

EXCELLENT PATIENT ACCEPTANCE

- New pleasant flavour encourages daily use
- Excellent enamel polishing qualities — removes plaque
- Good cleaning, foaming attributes *(an excellent substitute for a previously used cosmetic toothpaste)*

TOTAL TREATMENT

Sensodyne toothpaste/ Sensodyne Gentle toothbrush. It's all the help they may ever need.

BLOCK DRUG CO. (CANADA) LTD.
TORONTO, ONTARIO M4B 3E3

Complete clinical information on page 309

Letters

ACQUIRED CRANIOFACIAL HYPERTRICHOSIS

I had always been somewhat skeptical about etiologic inferences made from epidemiologic data, however, I feel compelled to share the following startling observations with the dental profession.

In the Division of Oral Pathology, Faculty of Dentistry, Dalhousie University, we have four oral pathologists, all of whom have a full beard and moustache-except Dr. Barbara Harsanyi. Dr. Bruce Wright, who always had a beard and or a moustache while an active member of the Division, has, during his leave of absence, gradually lost all evidence of facial hair. Intriguingly, both members of the Division of Oral Diagnosis (a division closely associated with Oral Pathology) have moustaches!

The statistical significance of this epidemiologic data is beyond reproach. The quantity of facial hair is directly proportional to one's activity in the field of oral pathology. After much reflection I isolated the specific etiologic agent—yes—the microscope! How neatly it all ties in now—the amount of exposure to the microscope determines the degree of activation of a recessive gene (for facial hair)on the X-chromosome. Women are thus generally immune. Some males are obviously hypersensitive to the postulated op(oral pathology)-rays emitted by the scope, and thus even transient contact will trigger full phenotypic expression.

The implications of this discovery raise some urgent questions that we must address as a profession: Will the quantity (and ultimately the quality) of facial hair be used for peer review purposes among oral pathologists? If so, are men's rights infringed upon by this genetic vulnerability? What is the REAL reason for wearing surgical masks? And how much do we really know about bearded ladies?

John G.L. Lovas, BSc, DDS, MSc.
Assistant Professor
Division of Oral Pathology
Dalhousie University, Halifax, N.S.

KNOW ONLY AS NUMBERS?

Dr. Dunn loves big words. . . "Consequent upon the implementation of such regulations, the litigiousness of those affected would be participatingly stimulated."

However, his telling us what lies buried in the verbiage of the British Columbia's Bill 24, Medical Services Act is really appreciated (JCDA Jan. '84).

B.C.'s College of Dental Surgeons has had, for many years, a policy position that all members should deal directly with their patients, and that insured patients should, after treatment, claim from their insurance company.

That policy continues in spite of the fact that over 90 % of us don't follow the policy. Why not? Many say that they don't want to lose patients and therefore, dollars.

In today's jargon, we take our stand on the bottom line; even if we become slaves to an all-powerful Commission, we hope our incomes at least will not be cut. What a hope!

Dr. Dunn alerts us to the provisions of the Act, which will grant us "billing numbers," and without which we shall be as nothing.

Bizarre echoes of the Book of Revelations: "These regulations will authorize the Commission to impose conditions upon a particular billing number, a class of billing number, or on all billing numbers, before or after the billing number has been granted." Mark of the beast?

A few years ago, many scoffed at the idea that in the brave new world we'd be known only as numbers; not so many today.

A small group of us still follow policy and fight under our own names; we'll survive. The high tide of collectivism soon will start to ebb, and you and I will become individuals again, with all our faults and virtues. But not without sacrifices.

Wasn't it one of Dr. Dunn's ancestors who advised us: "Seek not to ask for whom the bell tolls—it tolls for thee."?

Dennis Bullen, DMD, DDPH
Comox, British Columbia

GUIDELINES 'NOT ACCEPTABLE'

The "Guidelines for the Control of Radiation in the Dental Office" published in the January, 1984 issue of the Journal is an attempt to "set forth standards of practice" in radiation hygiene in the dental office. The CDA Board of Governors is to be congratulated for its good intentions, but, in their present form, the guidelines are not acceptable to the Canadian Academy of Oral Radiology.

This letter is not the format for a detailed discussion; however, the guidelines are replete with both conceptual and factual errors, together with opinions not shared by the oral radiological community.

It is the intention of the membership at the Annual Meeting of the Academy in April, 1984 to formulate a set of specific standards for the use of practising dentists.

The CAOR finds it most regrettable that a constituent society of the CDA comprised of educators and specialists in oral radiology was not asked to participate in this project. The best interests of the public and the profession will be ill served if these guidelines are followed without significant amendment.

F.G. Kellam
President, Canadian Academy of Oral Radiology

Ortho-teach ENGLAND July 12th–15th

Learn the European system of removable appliance techniques in Southern England this summer.

INTERCEPTIVE ORTHODONTICS

A series of lectures and workshops of case selection, treatment planning and removable appliance management.

Comprehensive Course Fee of £500 includes accommodation at The Ramada Hotel, Reading for Course Members and spouse.

For details, contact

Mrs. Pat Austin, Postgraduate Administrator, Royal Berkshire Hospital, Reading, RG1 5AN, England

JCDA Apr 85.

Continuing Dental Education

Sponsoring Institution Address	Location of Course	Title of Course	Subject Area	Date	Style	Instructor	Registration	Fee	Audience	Contact person/ Telephone
University of Alta. Cont. Ed. Faculty of Dentistry #4046 Dent/ Pharm Bldg Edmonton, Alta. T6G 2N8	Edmonton Alta.	Molar Endodontics	Endodontics	May 5 1984	Lect. Partic.	Drs. K. Zakariasen & G. Holland	Max. 40		GPs Spec.	Louise Grottoli 403-432-5023
University of Alta. Cont. Ed. Faculty of Dentistry #4046 Dent/ Pharm Bldg Edmonton, Alta. T6G 2N8	Edmonton Alta.	Clinical Gross Anatomy	Basic Science	May 11 May 12	Lect. Partic.	Dr. G. Sperber	Max. 20		GPs Hyg.	Louise Grottoli 403-432-5023
University of Alta. Cont. Ed. Faculty of Dentistry #4046 Dent/ Pharm Bldg Edmonton, Alta. T6G 2N8	Edmonton Alta.	Conscious Sedation	Anxiety & Pain Control	May 14-18	Lect. Partic.	Dr. B. K. Arora	Max 16.		GPs	Louise Grottoli 403-432-5023
University of Alta. Cont. Ed. Faculty of Dentistry #4046 Dent/ Pharm Bldg Edmonton, Alta. T6G 2N8	Edmonton Alta.	Root Planing, Current Concept in Clinical Practice	Periodontics	May 24 to 26	Lect. Partic.	Dr. A. Frydman	Max. 35		GPs Hyg.	Louise Grottoli 403-432-5023
Ontario Dental Assoc. 234 St. George St. Toronto, Ont. M5R 2P1	Toronto, Ont.	Perio 200	Periodontics	May 6	Partic.	Drs. G. Pearson and E. Freeman	Max 8	$325	GPs Spec.	416-922-3900 Dr. J. Goodman
Ontario Dental Assoc. 234 St. George St. Toronto, Ont. M5R 2P1	Toronto, Ont.	Endo 200	Endodontics	May 13	Partic.	Dr. B. Dolansky	Max 24	$325	GPs Spec.	416-922-3900 Dr. J. Goodman
Ontario Dental Assoc. 234 St. George St. Toronto, Ont. M5R 2P1	Toronto, Ont.	Practice Management Effective Pursuasion	Practice Management	May 25	Lect.	D. Prentice	Max 50	$150	Dental Team	416-922-3900 Dr. J. Goodman
Ontario Dental Assoc. 234 St. George St. Toronto, Ont. M5R 2P1	Windsor, Ont.	Choosing a Computer	Practice Management	June 1	Lect.	M. Barrington	Max 50	$150	Dental Team	416-922-3900 Dr. J. Goodman

Sponsoring Institution Address	Location of Course	Title of Course	Subject Area	Date	Style	Instructor	Regis-tration	Fee	Audience	Contact person/ Telephone
Ontario Dental Assoc. 234 St. George St. Toronto, Ont. M5R 2P1	Thunder Bay, Ont.	Staged Dental Treat-ment/ Occlusal Guidance	Pedo-dontics	June 1-2	Lect.	Dr. D. Kenny	Max 30	$150 Each	GPs Spec. Asst. Hyg.	416-922-3900 Dr. J. Goodman
Ontario Dental Assoc. 234 St. George St. Toronto, Ont. M5R 2P1	Ottawa, Ont.	Practice Building	Practice Manage-ment	June 8	Lect.	Dr. J. Britton	Max 50	$150	Dental Team	Dr. J. Goodman 416-922-3900
Ontario Dental Assoc. 234 St. George St. Toronto, Ont. M5R 2P1	Kitchener, Ont.	Team Building		June 8	Lect.	D. Prentice	Max 50	$150	Dental Team	Dr. J. Goodman 416-922-3900
Ontario Dental Assoc. 234 St. George St. Toronto, Ont. M5R 2P1	Alberta	Effective Pursu-asion	Practice Manage-ment	June 14	Lect.	D. Prentice	Max 50	$150	Dental Team	Dr. J. Goodman 416-922-3900
Ontario Dental Assoc. 234 St. George St. Toronto, Ont. M5R 2P1	Toronto, Ont.	Pain Control	Pain Control	June 15	Lect.	Dr. M. Hawkins	Max 50	$150	Dental Team	Dr. J. Goodman 416-922-3900
Ontario Dental Assoc. 234 St. George St. Toronto, Ont. M5R 2P1	Toronto, Ont.	Perio 200	Peri-odontics	June 22	Partic.	Drs. G. Pearson and E. Freeman	Max 8	$325	GPs Spec.	Dr. J. Goodman 416-922-3900
University of Western Ontario London, Ont. N6A 5C1	London, Ont.	Nitrous Oxide-Oxygen Conscious Sedation	Oral and Maxillo-facial Surgery	May 23-25	Lect. Demo. Partic.	Drs. I. Schofield and A. Parr	Max 25	$475 3 Eve $425 2 Eve	GPs	M. J. Weirsma 519-679-2862
University of Western Ontario London, Ont. N6A 5C1	London, Ont.	Practice Admin. in the 80's	Practice Manage-ment	June 1 and 2	Lect.	Dr. R. Brandon	Open	$200	Dental Team	M. J. Weirsma 519-679-2862
University of Western Ontario London, Ont. N6A 5C1	Montreal, Que.	Dental Trauma: Treatment and Trouble Shooting for Children and Ado-lescents	Pedo-dontics	April 27	Demo. Partic.	Drs. C. Dixter and S. Schwartz	Max 12	$125	GPs	M. J. Weirsma 519-679-2862
McGill University Faculty of Dentistry 740 Docteur Penfield Montreal, Que. H3A 1A4	Montreal, Que.	Laminate Veneers		May 4	Partic.	Dr. J. Blomfield		$225	GPs	Mrs. O. Chodan 514-392-4921

Continuing Dental Education

Sponsoring Institution Address	Location of Course	Title of Course	Subject Area	Date	Style	Instructor	Registration	Fee	Audience	Contact person/ Telephone
Université Laval Cité Universitaire Québec, Québec G1K 7P4	Québec, Québec	Anatomie de l'appareil manducateur		Mai 28 to Juin 8	Partic.		Max 15			Dr. Christian Bernard École Médecine Dentaire Université Laval Ste Foy, Que. G1K 7P4
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Université Laval Cité Universitaire Québec, Québec G1K 7P4	Québec, Québec	Biochimie buccale		Mai 28 to Juin 8	Partic.		Max 15			Dr. Christian Bernard École de Médecine Dentaire Université Laval Québec, G1K 7P4
Université Laval Cité Universitaire Québec, Québec G1K 7P4	Québec, Québec	Bactério-logie buccale		Mai 28 to Juin 8	Partic.		Max 15			Dr. Christian Bernard École de Médecine Dentaire Université Laval Québec, G1K 7P4
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Dalhousie University Halifax, N.S. B3H 3J5	Halifax, N.S.	Infectious Diseases	Oral Pathology	May 26	Lect.	Dr. A. Elgeneidy and Embil	Open		Dental Team	Kaireen Vaison 902-424-2248 or 902-424-6507
Dalhousie University Halifax, N.S. B3H 3J5	Halifax, N.S.	Dental Hygiene Refresher	Dental Hygiene	May 28 June 1	Lect. Demo. Partic.	TBA	Max 12		Hyg.	Kaireen Vaison 902-424-2248 or 902-424-6507
Dalhousie University Halifax, N.S. B3H 3J5	Halifax, N.S.	Computers in Dentistry		June 8-9	Lect. Demo. Partic.	TBA	Open		Dental Team	Kaireen Vaison 902-424-2248 or 902-424-6507

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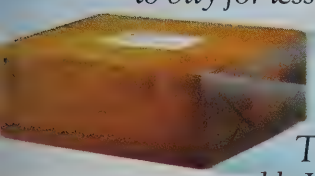

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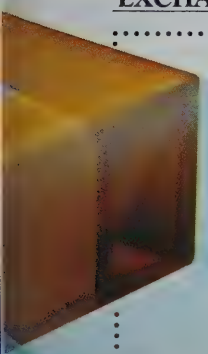

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Book Reviews

ORAL PREMALIGNANCY

Proceedings of the First Dows Symposium

Edited by: Mackenzie, I.C., Dabelsteen E., and Squier, C.A.,
hard cover
University of Iowa Press, Iowa City 1980
353 pages

Although pre-malignant lesions of the oral cavity are of significant clinical importance, their evolution is poorly understood. In an effort to better understand this pathologic phenomenon, a conference was convened at the Dows Institute for Dental Research at the University of Iowa, College of Dentistry. Loosely adhering to a program structure which encouraged not only the examination of the oral premalignancy concept, but also a review of current knowledge of premalignancy behaviour and an exploration of recent advances that may encourage rewarding research in this area, international authorities of the stature of Professor Jens Pindborg, Drs. William Shafer, Harold Slavkin and Charles Waldron, along with fifteen other esteemed clinicians and researchers delivered a series of papers which provided a general "state of the art" background. These papers served as a springboard, for workshop style discussions, which it was hoped would provide the raison d'être for this gathering. The edited form of these papers along with the three hundred and fifty pages of transcribed workshop discussions that followed, comprise this volume.

Unfortunately, innumerable new questions and few answers seem to constitute the fruits of this quorum's labours. An acceptable definition and agreed clinical significance of oral premalignant lesions remain elusive. While Professor Pindborg felt certain types of leukoplakia were "more prone to malignant transformation," Dr. Shafer's studies indicated "certain sites were histologically more serious." Another lecturer noted that the incidence of oral premalignancy may differ from one population group to another, and spontaneous or induced regression of leukoplakia may be higher than previously thought. Nineteen histologic tissue slides were circulated for assessment of dysplastic changes present, and only four of these cases could be totally agreed upon by the participants. Because no suitable animal model is available to study oral premalignancies, their mechanism of development and progression remain unrelated to basic concepts.

Rather than continuing along the enigmatic pathways this text explores, let's evaluate its work to you and I out in the clinical world of private practice. Papers on basic clinical and histologic features of oral premalignancy as well as a chapter on the structure of normal oral mucosa are excellent reviews for the rusty practitioner and superb instructional devices for both the dental graduate and undergraduate student. The discussions throughout the book are thought provoking, and have been intelligently edited. Illustrations are abundant and appropriately captioned.

As to be expected, the volume contains considerable information that is either too specific, too erudite or too detailed to have general appeal. This is not a general textbook, nor was it projected to be a companion for practising general dentists or most dental specialists. It should, however, be required reading for all oral pathologists and anyone involved in basic dental research.

This book was reviewed by
John H. Gryfe, DDS
Oral Surgeon
Weston, Ontario

CONTINUUM II, A REVIEW

E.D. Pankey Institute

New York, New York
$36.00 U.S. 98 pages

Continuum II, as Dr. L.D. Pankey noted in chapter I, is predominantly concerned with technical dentistry; that it is. He outlines the origins of the Pankey-Mann-Schuyler Technique and philosophy.

The P.M.S. Technique of producing a practical occlusal scheme for a single crown or for complete reconstruction of the occlusion is clearly outlined in this book. It is easy to read and has excellent diagrams, many in colour, to illustrate the technique.

During the past four decades in the study of mandibular function and occlusal reconstruction, we have had four or five leaders, each on divergent paths, each with his disciples. Several of the leaders have died, and many of the disciples have mellowed. As the dust settles in this latter quarter of the twentieth century we see that the various occlusal philosophies have the equivalent of the "Ten Commandments" in common—much as we find when we compare religions. The P.M.S. philosophy was and is one of the major occlusal philosophies. The leader is alive and well and the philosophy he teaches does work. Part of my training at graduate school in Indiana was the history of the five major occlusal philosophies, but the "true path" taught was pure gnathology: P.M.S. was considered a lesser religion. But it produces successful results.

In Continuum II, the importance of anterior incisal guidance; the line and plane of occlusion; and the functionally generated path techniques are covered in detail. The hard tissues of the oral cavity are considered the best articulator. The functionally generated path technique includes the intra oral and the laboratory procedures and variations to the technique.

There is an excellent chapter by Dr. Loren Miller on The Stress of Modern Professional Life. The book is worth the price, for this chapter. This is an important part of the Philosophy.

Dr. R. Presswood discusses the nickel chrome beryllium alloys and presents a strong case for their use. In my mind, these allows need an excellent track record of at least a decade before I will use them in my practise.

The last chapter in the book, by Dr. P. Mahan, Manifestations of Occlusal Disharmony, does a very creditable job of summarizing a complex subject. This chapter requires several readings to glean all the information that it contains.

I have just minor criticisms of the book. On the chapter, Anterior Guidance, when discussing the neuro muscular envelopes, speech, swallowing and mastication were described as "reflex actions that cannot be changed". I fail to understand the terms speech or masticatory reflexes. If the author means speech or masticatory patterns, that I understand. I also believe that such patterns can be changed. In two consecutive chapters, the authors mention that the P.M.S. Technique can be mastered by the "slightly above average dentist". After all, each of us considers herself or himself a "slightly above average dentist".

I highly recommend this book for all practitioners tailoring the tops of teeth.

This book was reviewed by
Alex Bowmen, DDS
Vancouver, B.C.

COMPOSITE RESINS AND DENTAL ESTHETICS

LES RÉSINES COMPOSITES ET L'ESTHÉTIQUE DENTAIRE

1. Adenubi, J. *The acid-etch technique in children: an experience in Lagos*. Journal of Dentistry, v. 10, no. 3, September 1982, pp. 235-242.
2. Black, J.B. *Esthetic restoration of tetracycline-stained teeth*. Journal of the American Dental Association, v. 104, no. 6, June 1982, pp. 846-852.
3. Boston, D.W. *Rationale and technique for composite resin restorations. Part I: Biological and physical characteristics*. Compendium of Continuing Education, v. 3, no. 3, May-June 1982, pp. 209-213 & 215.
4. Chabou, M. and Cambray, J.C. *Caractéristiques générales des matériaux composites de seconde génération*. Revue d'Odonto Stomatologie (Paris), v. 11, no. 1, January-February 1982, pp. 27-32.
5. Gibson, G.B. and Others. *A clinical evaluation of occlusal composite and amalgam restorations: one and two year results*. Journal of the American Dental Association, v. 104, no. 3, March 1982, pp. 335-337.
   Abstract: A two year study was conducted to compare the qualitative advantages, if any, of a conventional, cold-curing composite resin to amalgam in occlusal Class I cavities in posterior teeth. The composite was placed into modified, conservative cavity preparations using the acid etch technique. Sixty-one pairs of contralateral restorations were evaluated. Forty-six percent of the amalgams and 42.6% of the composites were considered sound. The major deficiency of each material was rough or chipped margins of the amalgams (38%) and worn surfaces of the composites (26%). The use of conservative cavity preparations and the acid-etch technique with bonding agent and final glaze improved the longevity of the composite restorations compared to previous studies. However, the improvement does not suggest that this method will have a long-term effect on clinical success nor does it indicate that composite is superior to amalgam other than in marginal integrity and esthetics.
6. Gourley, J.M. and Ambrose, E.R. *Veneering amalgam restorations*. Canadian Dental Association Journal, v. 48, no. 1, January 1982, pp. 49-50.
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8. Lambert, R.L. and others. *Esthetic composite resin facings for amalgam restorations*. General Dentistry, v. 31, no. 3, May-June 1983, pp. 222-224.
9. Milhauser, S.A. and Molnick, C.P. *Clinical application and evaluation of two light-activated color modifiers for composite resin restorations*. New York State Dental Journal, v. 49, no. 6, June-July 1983, pp. 397-398.
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13. Smith, D.C. and Pulver, F. *Aesthetic dental veneering materials*. International Dental Journal, v. 32, no. 3, September 1982, pp. 223-239.
    Abstract: There are numerous clinical indications for the use of aesthetic tooth coverings including heavily stained teeth, hypoplasia and other developmental disorders, and traumatic injuries. The acid etch technique provides a means of attaching composite resins and preformed acrylic veneers to enamel to cope with these problems. Four basic techniques are in use: (a) freehand placement of cold-cured or light-cured acrylic resins, (b) use of a crown form with technique (a), (c) commercially preformed acrylic laminated bonded to the tooth with cold- or light-cured resins and (d) individually made preformed laminates bonded as in (c).
14. Suzuki, M. and others. *Clinical management of non-carious enamel defects*. International Dental Journal, v. 32, no. 2, June 1982, pp. 148-158.
    Abstract: Enamel defects not caused by decay may occur singly or may be generalized over the entire tooth surface. In the past, treatment of these aesthetic problems required large cavity preparations or full crown coverage of the affected teeth. Now, with advent of various resin restorative materials capable of bonding to enamel, new techniques are being developed which are less radical. By etching the surface of the enamel with varying concentrations of dilute phosphoric acid, sufficient porosity is produced to allow the resin to adhere to it. Thus, by removing a minimal amount of tooth structure, the affected area can be masked with a thin layer of resin material after the surface has been properly prepared. If the fault in the enamel is generalized, the whole surface of the tooth may be restored using this technique, effectively covering the tooth with an aesthetic veneer. The new resin filling materials offer good colour stability as well as resistance to abrasive wear.

One copy of the above articles is available at no charge from the library to all CDA members. Non-members will be charged $5. This bibliography was generated with the help of MEDLARS, a computerized information retrieval system for the Health Sciences field, which has been operational at the library since February 1982, and is at the disposal of all members.

La bibliothèque de l'ADC offre gratuitement à ses membres et pour $5 aux non membres une copie des articles. Cette bibliographie a été préparée avec l'aide de MEDLARS, un système informatisé de recherche bibliographiques pour les sciences de la santé. Ajouté à la bibliothèque en février 1982, ce système est à la disposition de tous les membres.

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INTERVIEWS CAN BE POSITIVE

By Paul McLaughlin

Despite the blinding studio lights and the intimidating presence of the cameras, Dr. Harvey Swackhammer* was beginning to relax. After all, it was only an interview on National Dental Health Month for the local TV station. What could go wrong?

After several minutes of friendly, predictable questions, the interviewer, still smiling warmly, caught him by surprise.

"Why is it that 50 per cent of the population never goes to a dentist?" she asked. "Isn't it because your fees are too high and poor people can't afford your services."

Dr. Swackhammer* didn't know what to say. He felt his mind go blank and he started to panic.

"I, uh, I, uh. Look, no, we don't charge too much. Listen. . ."

"I know personally of a family with a daughter requiring considerable work, but the cost is prohibitive. How can you come on promoting dental health when your fees are part of the problem?"

The interview deteriorated from there, with the host jabbing away like Muhammed Ali in his prime and Dr. Swackhammer praying for the bell to save him.

When it was mercifully over, he was apoplectic with rage and started to lambaste the interviewer for "nailing me to the wall."

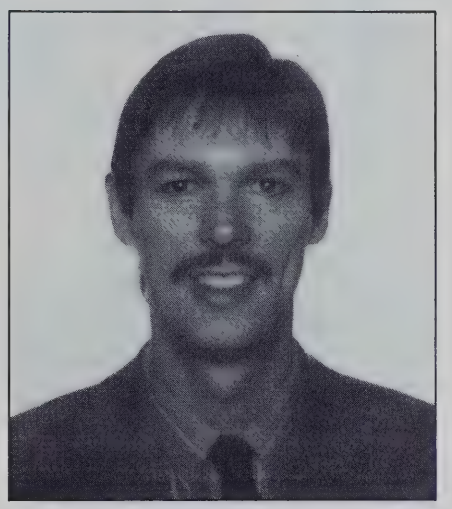
"Look, I'm sorry you're so upset," she said, "but I only asked the questions people have on their minds. You blew it. You didn't offer any answers. I could have defended your position better than you did, so don't cry to me if you're to blame."

And she was right.

More and more, today's business professional is being called upon to speak to the media. For many it can be a frightening experience, a trip into the unknown, with dangers lurking behind every question. What if I say the wrong thing? What if I make a fool of myself? What if the reporter distorts what I say?

'Disasters' unnecessary

These, and other concerns, combine with perhaps the most common fear of all – speaking in public – with the result that



many media encounters are disasters. Often the guest is so nervous and defensive that the interview is boring and of interest to no one. Even worse, the nervousness can appear as evasiveness, hostility, giving the public a negative impression, when the opposite should have occurred.

The answer, some believe, is to decline the interview, the "nothing ventured/nothing lost" philosophy. But that is not true. Aside from the fact that "no comment" is perceived as a pejorative in our society, a media encounter is an opportunity to present *your* position on an issue, be it a contentious one or not. The media will not shy away from a subject just because one party refuses to take part. Rather, that refusal will simply reinforce their belief that there is something to attack; and the public may be served up a one-sided version of a story, which your involvement could have prevented.

The ostrich approach is not the answer. Instead, the solution is to apply a professional strategy to the problem: learn how to be interviewed.

Contrary to popular belief, an interview is not a "spontaneous" event where two parties get together to talk and whatever comes out, comes out. The interviewer researches the subject, prepares questions, structures the interview, talks to other parties involved in the issue, pre-determines certain approaches, takes any technological aspects into consideration, discusses potential danger areas with his colleagues and lawyers and tries to leave as little possible to chance. Then he goes into the interview and, with all this background information to fall back upon, genuinely tries to react spontaneously to what takes place. Most interviewees go in just trying to come out alive.

Being interviewed is a skill which, like any other, can be learned to a certain degree. While an outgoing, ebullient person may feel more comfortable, especially with TV and radio, that does not mean the more reserved type of person cannot do well. Many of the problems, particularly the apprehensions, are caused by not knowing what the media wants, how it works. And fear of the unknown can be very unsettling.

Some suggestions

For TV interviews in particular, although most points pertain to radio and newspaper interviews as well, here are some suggestions to consider:

Before the interview starts, make sure you are seated comfortably. Sit up straight so you can breathe properly and look assertive. Try to avoid closing your body up in a defensive position. Don't fold your arms across your chest, grab the edges of the chair in the "airplane position" or adopt the "Lincoln Memorial" look – body rigid, legs far apart, hands clawing each thigh.

Keep your arms resting casually on your legs or the chair arms and use them to explain a point, even more than you normally would. It makes the picture most interesting to look at, will help you to open up and tends to add expression to your voice. Cross your legs if you must, but a better choice is to cross them at the ankles. The more open your body, the more open you will be.

It has been estimated that non-verbal communication accounts for 55 per cent of the total message the TV audience receives. The voice accounts for another 38 per cent. Whether such precise figures are accurate is debatable, but the point they are making

is not. If the audience perceives you to be defensive or hostile or evasive, that impression will supercede what you are saying.

Difficult as it may be, try to maintain as much eye contact with the interviewer as possible. Especially when asked a tough question. Don't look at the camera unless instructed to.

Use everyday language. Nothing alienates people quicker than language they can't understand. Avoid sounding like a bureaucrat.

Give short, precise answers. TV can't wait for you to give a dissertation. The reporter will interrupt you.

Try to have a message that you want to get across. In a five minute interview there is only so much that can be covered.

Don't allow the interviewer to bully you. Stand up for your rights. If you are constantly being interrupted before having a chance to reply, ask to have the chance to finish your answer. Say it firmly but not antagonistically.

Maintain your standards

Remember there is an audience watching. If the interviewer is being quite nasty, try to maintain your standards. The audience will judge who is coming across better.

Bear in mind that, by definition, an interview is usually adversarial. The interviewer must probe, ask challenging questions, put you on the spot. He may not even believe in the point he's making, but feels the question must be asked. Try to avoid taking it as a personal attack. If you respond well to a tough question, the audience will be impressed and you can gain considerably.

Be as honest as possible. Trouble usually begins when you start to obfuscate. If you don't know an answer, say so openly, explaining why you don't.

Try to be as natural as possible, which means smiling at times, using humour where applicable, admitting you, or your association could do a better job if that's the case, allowing yourself to make a mistake and maybe even enjoying yourself.

While these pointers can help you do better during an interview, it is also important to take some time to prepare before the interview begins:

Try to find out the purpose of the interview, the *angle* or aspect the interviewer wishes to pursue.

Ask if the interview will be live or taped, how long it will last, if it will be edited. Ask some information about the style of the program, the format (will there be other guests) and the audience.

Imagine the questions

Take a few minutes to imagine what questions you might be asked, especially if you anticipate a tough interview. If you know it's going to be a five minute interview on denture therapists, you should be able to predict the questions the interviewer will ask.

Make sure you know where you stand *before* going on-air. Nothing is worse than trying to formulate a policy when under pressure. Have a position, a message that you would like to get across.

Rehearse the interview in your mind, always positively. Imagine the interview taking place, what questions could be asked, what answers you might give. Don't memorize them, but try them out for size ahead of time. It will have a positive benefit.

Although these suggestions cover only part of learning how to be interviewed, if applied they should help make your media encounters more positive. The benefits can be quite substantial, as pointed out in the CDA's July, 1983 Communique. Soon after having taken a media workshop, the New Brunswick Dental Society called a news conference to oppose a move by the Provincial Government to withdraw funding from the entire Social Assistance Dental Program. "This conference was so well presented that it forced the Government to reconsider its position," reports the Communique. Dr. Clement LeBlanc, the chairman of the negotiating committee, attributed the success of the media encounter and the decision by the Society to take the initiative, to the skills learned in the media training workshop.

With the media's influence expanding constantly, the ability to handle yourself effectively with a reporter is fast becoming a prerequisite skill. The day is long gone when the professional or executive can simply walk into a media interview and hope for the best. Just ask Dr. Swackhammer.*

Paul McLaughlin is a freelance writer, broadcaster and teacher. He has conducted a number of workshops for regional groups of CDA member dentists, counselling them on how to prepare themselves for media interviews. Mr. McLaughlin's firm is *McLaughlin Associates*, based in Toronto, Ont.

*The name used is fictitious and any similarity to an actual dentist's name is purely coincidental.

OBITUARIES/NÉCROLOGIES

BUGDEN, H.C.: Dr. Bugden, a resident of Ottawa, Ontario at the time of his death, had a distinguished career in dentistry. A fellow of the International College of Dentists and member of the Pierre Fauchard Society, Dr. Bugden was also active in the CDA. He was a former president of the Ottawa Dental Society and governor of the Ontario Dental Association. Born in 1919, he was a graduate of the University of Toronto in 1950.

HIGGINSON, T.D.: Dr. Higginson, one of the oldest dentists in Ontario, passed away recently at the age of 103. Born in Hawkesbury, Ontario in 1881, Dr. Higginson practiced dentistry in Ottawa for 50 years before his retirement. He graduated from the RCDS of Ontario in 1908.

HOFFMAN, R.W.: Dr. Hoffman, a graduate from the Royal College of Dental Surgeons in 1916, was a Life Member of the Canadian Dental Association. He was born in 1896, and was residing at Warner Bay, Tobermory, Ontario at the time of his death.

LEFORT, G.: A graduate of the Université de Montréal in 1922, Dr. Lefort was born in 1899. He was a resident of Ste-Agathe, Quebec at the time of his death.

PAGEL, L.: Dr. Pagel, a resident of Toronto at the time of his death, was born in 1947. He graduated from the University of Toronto in 1973.

SHERMAN, J.A.: A Life Member of the CDA, Dr. Sherman was born in 1901. He graduated from the University of Toronto in 1924. He was residing in Toronto at the time of his death.

OBITS

In the February edition of the Journal, it was reported that Dr. R. G. Guenther, of Astra, Ontario, who died in October of 1983, was a member of the Canadian Armed Forces. While he was a practicing dentist on CFB Trenton at the time of his death, as reported in the Journal, he practiced dentistry as a civilian dentist and not as a member of the Armed Forces.

Dr. G. Gunther, a practicing dentist at CFB Trenton, and a member of the Armed Forces, was, at last report, very much alive. His colleague, Dr. R. G. Guenther, a civilian dentist, is deceased, as was reported in the February 1984 issue of the Journal.

INFLATION AND YOUR MONEY

By Jim Garner

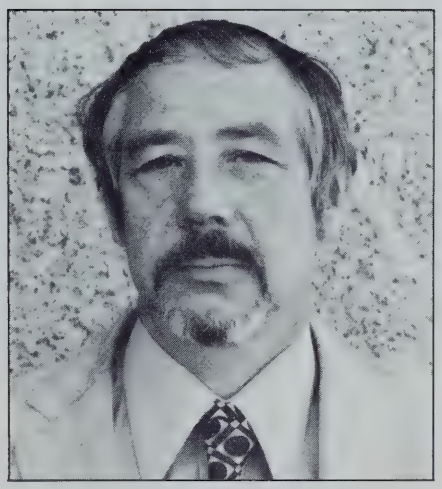
Thrift is a virtue that's so old-fashioned these days we will soon be finding that dictionaries are listing the word as archaic. Economists tell us to spend our way out of depression, the government runs up a deficit of $30 billion a year and the federal guaranteed income supplement is designed so that any moderate income person who saves for his old age loses 50 cents of government income for every dollar of private income he has managed to scrape together (thus inflicting on most old-age pensioners a higher effective rate of taxation than Conrad Black or Ken Thompson pays).

None the less, there are those hard-working professionals who want to take on the system. They want to save some of their hard-earned money and keep it. The odds are against them, given the combination of inflation and taxation, but it is just possible to maintain the value of a nest-egg.

Of course there are professional people who are astute at finance and can afford several hours a week to look after their investments. If you're one of these, stop reading; this article is not for you. But if you're a busy dentist and you aren't aiming at overnight wealth, let's look at some commonsense strategies that will serve in this inflationary age.

First, there's the magic three per cent. This is the amount by which the yield on high-quality bonds, on average, exceeds inflation. Thus if you have, say, $100,000 in a bond fund you might expect the value to rise to about $110,000. Inflation would reduce the purchasing power by about $7000, leaving you three percent better off.

Readers will speedily spot the snag. The government will levy tax on $10,000 (perhaps less the $1,000 investment interest allowance), and you end up actually losing a little of your purchasing power.



That's why tax shelters are so useful. A professional will be allowed by 1988 to put up to $15,500 a year into a registered retirement savings plan. It's important to start doing this early in your career because you are sheltering not just the $15,500 (or as much as you can manage) but the interest that it will be accumulating over the decades.

The increase in the RRSP allowance announced in the Feb. 15 budget is not all gain, though. The taxpaper between 65 and 71 can no longer roll his old-age pension and Canada Pension Plan payments into an RRSP, so during the transitional period to 1988, some people will actually be losing part of their present tax shelters.

That three per cent real gain is the irreducible minimum that you can get and keep safely. Not much, but better than taking a loss. And over the decades even that small yield can mount up. For instance, had Judas Iscariot socked his 30 bucks into a tax-sheltered trust fund averaging three per cent, it would today be worth $375 trillion trillion.

There are other tax shelters and bigger and better rates of return, however. Forget the 50 per cent a year capital gain that some of your friends probably boast about—they don't mention the hidings they've taken. The first essential in a commonsense strategy is to look carefully at yourself and admit you're a financial nignog. Then you might reasonably think about beating inflation by five to 10 per cent a year and keeping most of it away from the tax gatherer.

Other than RRSPs, most of the tax shelters require expertise, time or both. And this article is aimed at those with little of either. Thus, real estate is a traditional hedge against inflation and it can produce good annual returns—but not if you're a busy absentee owner. Oil and gas leases and the new R&D tax credit shares can bring rewards to the expert. The financial community is not exactly rushing to recommend the government's ISIP (indexed security investment plan); a financial holding company seems to offer as much and be more flexible for funds outside RRSPs. Christmas tree farms, again, offer rewards mostly to those with time for Christmas tree farming.

Tax sheltering is not the sole objective in a commonsense plan. The investment must also stand on its own merits. That's the problem with many of the MURB (multiple unit residential building) plans that are being touted; they offer tax savings but don't give a reasonable return otherwise.

So for reliable, hands-off investment, probably the RRSP-mutual fund route will provide the best long-term result. There's a bewildering plethora of mutual funds,

some eligible for RRSPs, some not, but fortunately there's a simple way to pick out the best for your purpose. What you're doing, actually, is to select the most able manager of your money. You therefore need to consult his track record, which you can do.

How? All you do is to subscribe to the weekly *Financial Times*. Once a month, the paper publishes a comprehensive list of mutual funds, showing how they have performed in the last one, three, five and 10 years. You'll find that publicly available funds like Royfund and the Canadian Anaesthetists have done well and are eligible for RRSP investment. Some other good ones, like Templeton Growth, are ineligible because of a high proportion of assets in the US, Japan, Europe, Australia and even Taiwan, South Korea and Hong Kong. If you have more funds available than your RRSP can accept these are good risk-spreaders. If you have a practice management company (and if you haven't you should be seeing your accountant about one tomorrow) the company earnings might be retained and used for these funds. Thus you get partial tax sheltering.

So let's do our arithmetic. You're 30 years old and come-what-may you're going to put say $10,000 a year into an RRSP—and that's only $5,000 of your own disposable income plus $5,000 of the government's money. You'll probably beat inflation by eight per cent. So by 2015, retiring age, you will have have, in today's dollars, about $1.2 million. At 60 your life expectancy is 16.95 or 21.39 years, depending on your gender, and for $1.2 million a life insurance company will happily sell you an inflation-protected annuity of $60,000 to $85,000 a year, according to the options chosen. The taxman will be after you at that point, of course, but you have all your deductions available. And there's still that little-known tax loophole under which a person retiring to Florida or Hawaii can buy an American annuity with Canadian RRSP money and pay no tax on the income in either country. So you could wind up with $5,000 a month clear.

Not bad for a financial nignog.

Jim Garner is an Ottawa freelance writer. The opinions he expresses are his own and not those of the Canadian Dental Association. Readers are urged to consult their tax advisers before acting on any of the suggestions contained herein.

The Canadian Dental Association offers Retirement Savings Plans with four options: money market, guaranteed funds, common stock and diversified. These plans are administered by the Canadian Dental Service Plans Inc (CDSPI). Details were published in a CDA Member Services article in this Journal in the January, 1984 edition.

Motrin®
(ibuprofen) tablets

Product Information

Action: Ibuprofen has demonstrated anti-inflammatory, analgesic and antipyretic activity in animal studies designed to specifically demonstrate these effects. Ibuprofen has no demonstrable glucocorticoid effect

Following a single 200 mg dose of ibuprofen in humans, useful blood levels were demonstrable in 45 minutes and still present in six hours but at barely detectable levels. Peak levels occurred at approximately one hour after ingestion. Levels were lower when taken in conjunction with food

Ibuprofen is rapidly metabolized and eliminated in the urine. The excretion of ibuprofen is virtually complete 24 hours after the last dose. The serum half-life of ibuprofen is 1.8 to 2 hours. There is no evidence of drug accumulation or enzyme induction

Ibuprofen has been found to be less likely to cause gastro-intestinal bleeding in doses usually used than is acetylsalicylic acid

Clinical trials in man have shown activity of a dose of 1200–1800 mg of ibuprofen daily to be similar to that of 3.6 grams of acetylsalicylic acid daily

Indications and Clinical Uses: Motrin (ibuprofen) is indicated for the treatment of rheumatoid arthritis and osteoarthritis. Motrin is also indicated for the relief of mild to moderate pain accompanied by inflammation in conditions such as musculo-skeletal trauma and post-dental extraction. Motrin is also indicated for the relief of pain associated with dysmenorrhea

Contraindications: Motrin (ibuprofen) should not be used in patients who have previously exhibited hypersensitivity to it, or in individuals with the syndrome of nasal polyps, angioedema and bronchospastic reactivity to acetylsalicylic acid or other nonsteroidal anti-inflammatory agents. (see WARNINGS)

Motrin should not be used during pregnancy, in nursing mothers or in pediatric patients because its safety under these conditions has not been established

Warnings: Anaphylactoid reactions have occurred in patients with known A.S.A. hypersensitivity (see CONTRAINDICATIONS)

Peptic ulceration and gastrointestinal bleeding, sometimes severe, have been reported in patients receiving Motrin (ibuprofen). Peptic ulceration, perforation, or severe gastrointestinal bleeding can have a fatal outcome, and although few such reports have been received with Motrin, a cause and effect relationship has not been established. Motrin should be given under close supervision to patients with a history of upper gastro-intestinal tract disease

Precautions: Blurred and/or diminished vision, scotomata, and/or changes in colour vision have been reported. If a patient develops such complaints while receiving Motrin (ibuprofen), the drug should be discontinued and the patient should have an ophthalmologic examination

Fluid retention and edema have been reported in association with Motrin therefore, the drug should be used with caution in patients with a history of cardiac decompensation or renal disease

Motrin, like other nonsteroidal anti-inflammatory agents, can inhibit platelet aggregation but the effect is quantitatively less and of shorter duration than that seen with acetylsalicylic acid. Motrin has been shown to prolong bleeding time (but within the normal range) in normal subjects. Because this prolonged bleeding effect may be exaggerated in patients with underlying hemostatic defects, Motrin should be used with caution in persons with intrinsic coagulation defects and those on anticoagulant therapy

Patients on Motrin should be cautioned to report to their physicians signs or symptoms of gastrointestinal ulceration or bleeding, blurred vision or other eye symptoms, skin rash, weight gain, or edema

When Motrin is added to the treatment program of patients who have been on prolonged corticosteroid therapy, and it is decided to discontinue this therapy, the corticosteroid should be tapered slowly to avoid exacerbation of disease or adrenal insufficiency

Aseptic meningitis has been reported in connection with Motrin therapy in patients with systemic lupus erythematosus. Such patients may also develop hypersensitivity reactions to Motrin such as fever, rash or abnormal liver function more often than those with other disorders. Caution should therefore be exercised when considering Motrin therapy for patients with systemic lupus erythematosus.

Drug Interactions

Coumarin-type anticoagulants: Several short-term controlled studies failed to show that Motrin significantly affected prothrombin times or a variety of other clotting factors when administered to individuals on coumarin-type anticoagulants. However, because bleeding has been reported when Motrin and other nonsteroidal anti-inflammatory agents have been administered to patients on coumarin-type anticoagulants, the physician should be cautious when administering Motrin to patients on anticoagulants

A.S.A: Animal studies show that A.S.A. given with nonsteroidal anti-inflammatory agents including Motrin yields a net decrease in anti-inflammatory activity with lowered blood levels of the non-A.S.A. drug. Single dose bioavailability studies in normal volunteers have failed to show an effect of A.S.A. on Motrin blood levels. Correlative clinical studies have not been done.

Adverse Reactions: The following adverse reactions have been noted in patients treated with Motrin (ibuprofen):

Note: Reactions listed below under Causal Relationship Unknown are those which occurred under circumstances where a causal relationship could not be established. However, in these rarely reported events, the possibility of a relationship to Motrin cannot be excluded.

Gastrointestinal: The adverse reactions most frequently seen with Motrin therapy involve the gastrointestinal system

Incidence 3 to 9%: nausea, epigastric pain, heartburn

Incidence 1 to 3%: diarrhea, abdominal distress, nausea and vomiting, indigestion, constipation, abdominal cramps or pain, fullness of the gastrointestinal tract (bloating or flatulence)

Incidence less than 1%: gastric or duodenal ulcer with bleeding and/or perforation, gastrointestinal hemorrhage, melena, hepatitis, jaundice, abnormal liver function (SGOT, serum bilirubin and alkaline phosphatase)

Central Nervous System.

Incidence 3 to 9%: dizziness

Incidence 1 to 3%: headache, nervousness

Incidence less than 1%: depression, insomnia

Causal relationship unknown: paresthesias, hallucinations, dream abnormalities

Dermatologic

Incidence 3 to 9%: rash (including maculopapular type)

Incidence 1 to 3%: pruritus

Incidence less than 1%: vesiculobullous eruptions, urticaria, erythema multiforme

Causal relationship unknown, alopecia, Stevens-Johnson syndrome

Special Senses

Incidence 1 to 3%: tinnitus

Incidence less than 1%: amblyopia (blurred and/or diminished vision, scotomata and/or changes in colour vision). Any patient with eye complaints during Motrin therapy should have an ophthalmological examination (see PRECAUTIONS)

Causal relationship unknown: conjunctivitis, diplopia, optic neuritis.

Metabolic

Incidence 1 to 3%: decreased appetite, edema, fluid retention. Fluid retention generally responds promptly to drug discontinuation (see PRECAUTIONS)

Hematologic

Incidence less than 1%: leukopenia and decreases in hemoglobin and hematocrit

Causal relationship unknown: hemolytic anemia, thrombocytopenia, granulocytopenia, bleeding episodes (e.g. purpura, epistaxis, hematuria, menorrhagia)

Cardiovascular.

Incidence less than 1%: congestive heart failure in patients with marginal cardiac function, elevated blood pressure.

Causal relationship unknown: arrhythmias (sinus tachycardia, sinus bradycardia, palpitations)

Allergic

Incidence less than 1%: anaphylaxis (see CONTRAINDICATIONS)

Causal relationship unknown, fever, serum sickness, lupus erythematosus syndrome

Endocrine

Causal relationship unknown, gynecomastia, hypoglycemic reaction.

Renal

Causal relationship unknown: decreased creatinine clearance, polyuria, azotemia

Symptoms and Treatment of Overdosage: A nineteen month old child weighing 12 kg ingested from 2800 to 4000 mg of Motrin (ibuprofen) and presented with apnea, cyanosis and responded only to painful stimuli. Oxygen and parenteral fluids were given and at 12 hours she appeared completely recovered. Two other children (10 kg each) ingested 1200 mg of Motrin each and there were no signs of acute intoxication or late sequelae. A 19 year old male who had ingested 8000 mg of Motrin reported dizziness, and nystagmus was noted. He recovered with no reported sequelae after parenteral hydration and three days' bed rest

In cases of acute overdosage, the stomach should be emptied by vomiting or lavage, though little drug will likely be recovered if more than an hour has elapsed since ingestion. Because the drug is acidic and is excreted in the urine, it is theoretically beneficial to administer alkali and induce diuresis

Dosage and Administration: *Rheumatoid arthritis and osteoarthritis:* The initial daily dosage in adults is 1200 mg divided into 3 or 4 equal doses. Depending on the therapeutic response, the dose may be adjusted downward or upward. The daily dosage should not exceed 2400 mg

Maintenance therapy, once maximum response is obtained, will range from 800 to 1200 mg per day.

Mild to moderate pain accompanied with inflammation, dysmenorrhea: 400 mg repeated as required every 4 to 6 hours. The daily dosage should not exceed 2400 mg.

Children: Due to the lack of clinical experience, ibuprofen is not indicated for use in children under 12 years of age.

Supplied: 200 mg (yellow), 300 mg (white), 400 mg (orange) sugar-coated tablets and 600 mg (peach) film-coated tablets in bottles of 100 and 1000

Product monograph available on request. CE 1542 1C

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Canadian Fund for Dental Education

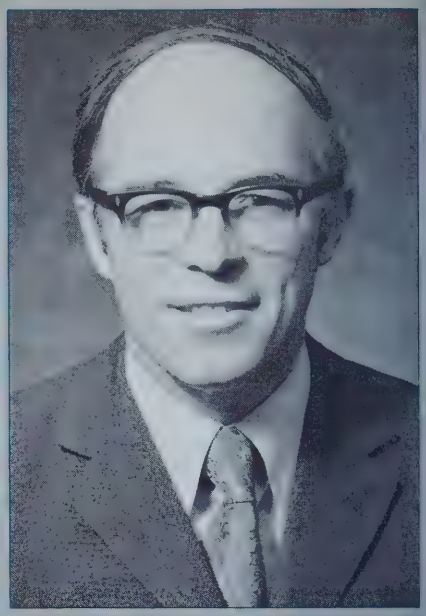
Fonds canadien pour l'enseignement dentaire

Annual Report Honour Roll 1983

Rapport Annuel Tableau d'honneur

CFDE FCED

Chairman's Report



It is a particular pleasure for me to report to you this year as I have lots of good news and little, if any, bad.

Record levels of income

In 1983 the bellwether of our progress, "personal gifts from dentists", soared to a record high of $82,285, or 11.2% more than the previous year's record total.

An important factor in this fine achievement were increases in the number of Patrons and Honour Members to 83 and 293 from 57 and 266 respectively.

Business and industry also hit a new high of $86,626, a 2% increase from the 1982 total of $85,099.

You will recall that in my report last year I pointed out that since 1978 gifts from business and industry have exceeded those from dentists. I hoped that in 1983 we as health professionals would again show the leadership that is so essential to the Fund's continuing success. While that goal was not realized in 1983, the fine increase in personal gifts from dentists is a great step forward and I am confident that in 1984 doctors across the country will again lead the way in supporting their own Fund.

Dental organizations moved ahead in 1983 to $19,645, up from $17,420 in the previous year.

It is a pleasure to report that a much appreciated endowment contribution of $8,225 was received from Rhône-Poulenc Pharma Inc. in 1983. The Company directed that the annual income from the endowment be used for educational programs as decided by the Trustees.

More help for dentistry

You will be pleased to learn that in 1983 a total of $138,549, or $2,656 more than in 1982, was invested in grants for dental educational and research programs. In fact, grants **approved** for 1983 were over $12,000 more than was actually paid. This decrease is primarily due to a substantial reduction in the expenses for the annual students' conference and the CDA/Dentsply student clinician program as well as the elimination of a fellowship because of MRC support.

Complete details of the Fund's substantial assistance for dentistry in 1983 are shown on page 4 of this report.

Please note that an excess of $18,000 of revenue over expenditures in 1983 plus a generous gift of $10,000, which was received early in 1984 earmarked for the previous year, will be available for investment in dentistry in 1984.

Overhead is down

In 1982 I reported that management and fund raising costs as a percentage of total income were just slightly higher than in the previous year and that I expected we would do better in 1983. I am both proud and happy to say that with a great deal of cooperation from all concerned, particularly our dedicated staff, these costs were reduced to 28.9% from 34.7% in 1982. A truly remarkable achievement in these inflationary times.

What about the future

Your Trustees will certainly continue to support ongoing Fund programs that have already made and, we are confident, will continue to make an important contribution to a constantly improving level of dental health care — programs such as research conferences, teacher training fellowships and student table clinics, to mention just a few.

Additionally we are constantly searching for new ways to help our profession. For example, we are all aware that there are many men, women and children who need and deserve more dental health care.

In 1983 CFDE made a grant of $2,000 to help promote dental health month in Canada. This was only an initial step and you can be sure that in future we will do much more in this critical area.

A record to be proud of

On page 5 we have detailed exactly what the Fund has done to benefit dentists, dental students, dental hygienists, dental nurses and assistants, dentally related companies and finally the general public.

I think all of us who have contributed our dollars to CFDE can take a great deal of pride in what has been accomplished in just 21 years.

Our thanks to you

On behalf of my fellow Trustees I want to express grateful appreciation for the help you, our contributors, have already provided for dentistry and to assure you that we will continue to do our utmost to obtain maximum value for every dollar you entrust to our care.

David K. Peters

David K. Peters, D.D.S.

Le rapport du président

C'est avec très grand plaisir que je puis vous signaler, cette année, que je n'ai que des bonnes nouvelles à annoncer.

Des revenus qui battent tous les records

En tête des progrès effectués en 1983, se situent les "dons personnels des dentistes" qui ont grimpé en flèche pour atteindre le chiffre record de 82,285 $, soit une hausse de 11,2% en comparaison de la somme record recueillie l'année précédente.

Un important facteur qui a contribué à ce succès était l'augmentation du nombre de bienfaiteurs et de membres d'honneur, qui a passé de 57 et 266 respectivement, à 83 et 293.

Les dons provenant de l'industrie ont également battu tous les records préalables avec 86,626 $, une hausse de 2% sur les contributions de 1982 qui s'élevaient à 85,099 $.

Dans mon rapport de l'an passé, je soulignais que depuis 1978, les contributions provenant de l'industrie dépassaient celles faites par les dentistes. J'espérais qu'en 1983, nous les professionnels de la santé, reprendrions notre place en tête et que nous ferions preuve de l'esprit essentiel pour le succès du Fonds. Bien que cet objectif n'ait pas été réalisé en 1983, la généreuse augmentation des dons personnels provenant des dentistes représente un important pas en avant et je suis persuadé qu'en 1984, les docteurs de tout le Canada se situeront à nouveau en tête de file de leur propre Fonds.

Les organismes dentaires sont passés de 17,420 $ en 1982, à 19,645 $ en 1983.

Je vous signale également avec grand plaisir que la Compagnie Rhône-Poulenc Pharma Inc. nous a offert, en 1983, un don sous forme de fonds de dotation, s'élevant à 8,225 $, pour lequel le FCED lui est très reconnaissant. La Compagnie demande que le revenu annuel de ce fonds serve à des programmes d'enseignement, selon la décision des fiduciaires.

Une aide plus considérable pour la médecine dentaire

Nous sommes heureux de vous faire savoir qu'en 1983, la somme de 138,549 $, soit une augmentation de 2,656 $ en regard de 1982, a été investie en subventions destinées à des programmes d'enseignement et de recherche dentaires. En fait, les subventions **approuvées** pour 1983 dépassaient de plus de 12,000 $ les sommes effectivement versées. Cet écart provient principalement de la réduction considérable des frais entraînés par la conférence annuelle des étudiants et par le programme clinique pour étudiants de l'ADC/Dentsply, ainsi que de l'élimination d'une bourse en raison de l'appui obtenu du CRM.

Voir à la page 4 les détails de l'appui considérable apporté par le Fonds à la médecine dentaire en 1983.

Il vaut la peine de noter que 18,000 $, soit le surplus de revenu en regard des dépenses pour 1983, plus un don généreux de 10,000 $ reçu au début de 1984 et destiné à l'année précédente, seront également investis en 1984.

Nos frais généraux diminuent

J'indiquais, en 1982, que les coûts de gestion et de recueil de fonds, à titre de pourcentage de notre revenu total, étaient légèrement supérieurs que pour l'année précédente et que j'envisageais remédier à cette situation en 1983. Je suis fier de vous faire savoir que grâce à la coopération de toutes les parties concernées, et particulièrement celle de notre dévoué personnel, ces coûts sont passés de 34,7% en 1982 à 28,9% en 1983, une réalisation réellement remarquable vu la période d'inflation que nous vivons.

L'avenir

Vos fiduciaires continueront à financer les programmes en cours; comme par le passé, ces programmes qui comprennent les congrès de recherche, les subventions de formation aux enseignants et les tables cliniques pour les étudiants, visent à l'amélioration constante des soins dentaires.

Nous sommes aussi toujours à la recherche de nouvelles méthodes destinées à seconder la profession. Nous savons tous qu'il y a de nombreuses personnes, hommes, femmes, enfants, qui ont besoin et qui méritent de meilleurs soins dentaires. En 1983, le FCED a accordé une subvention de 2,000 $ à la promotion du Mois de la santé dentaire au Canada. Ceci ne représentait qu'une étape initiale et soyez certains qu'à l'avenir, le Fonds en fera bien davantage en ce qui concerne cet important projet.

Des données dont nous sommes fiers

Nous avons détaillé avec précision à la page 5, ce que le Fonds a fait au profit des dentistes, des étudiants, des hygiénistes dentaires, des infirmières et assistantes dentaires, des industries connexes et du grand public.

J'estime que tous ceux qui ont contribué leur argent au Fonds peuvent être très fiers de ce qui a été réalisé en seulement 21 ans.

Un grand merci

Je désire exprimer, au nom de tous les fiduciaires, notre profonde reconnaissance pour l'appui que vous avez donné à la profession dans le passé et vous assurer que nous continuerons à faire tout notre possible pour obtenir un rendement maximal pour chaque dollar que vous nous confiez.

David K. Peters

David K. Peters, D.D.S.

1983 Financial Highlights
Faits financiers marquants

Income by source

Sources des revenus

Business and industry Commerce et industrie	$ 94,851	37%
Dental profession Profession dentaire	83,922	32%
Investment and sundry income Revenus de placements et de sources diverses	60,365	23%
Dental organizations Associations dentaires	19,645	8%
TOTAL	**$258,783**	**100%**

Dentistry has been enhanced by these grants

La médecine dentaire a pu faire de grands progrès grâce à ces subventions

Teacher training fellowships (Dentists and Dental Hygienists) Bourses de formation en enseignement (Dentistes et Hygiénistes dentaires)	$ 57,000	41%
Grants to dental schools Subventions aux écoles dentaires	25,000	18%
Student table clinics and conference Conférence et cliniques sur table des étudiants	14,543	11%
Lorne E. MacLachlan Endowment / Dotation— Teacher training awards Bourses pour la formation d'enseignants	10,040	7%
Dental teaching conference Conférence sur l'enseignement dentaire	8,000	6%
Research projects / Projets de recherche — Universities of Toronto and Western Ontario Universités de Toronto et de Western Ontario	6,950	5%
Symposia / Colloques — Universities of Manitoba and Dalhousie Universités de Manitoba et Dalhousie	5,700	4%
Dental hygiene workshop and educational projects Atelier d'hygiène dentaire et projets d'enseignement	3,991	3%
Dental Health Month Le mois de la santé dentaire	2,000	1%
Sundry awards Octrois divers	5,325	4%
TOTAL	**$138,549**	**100%**

Uses of support and revenue Emploi des fonds de soutien et revenus	$ 258,783
Program commitments / Programmes (1983 - 61.0%, 1984 - 10.1%)	71.1%
Fund raising / Recueil de fonds	17.7%
Management and general / Gestion et général	11.2%

1963 to 1983

It has been said that an organization entirely dependent upon voluntary support may determine its future potential in direct proportion to the soundness of the use it makes of the contributors' dollars.

L'on dit parfois qu'un organisme qui dépend totalement de fonds bénévoles peut déterminer son potentiel selon le degré de discernement avec lequel il dépense son argent.

Here is how your contributions have helped to build a stronger dental profession

Voici comment vos dons ont contribué à améliorer la profession dentaire

Teacher training fellowships for dentists Bourses de formation en enseignement pour les dentistes	$ 780,715	45%
Grants to dental schools Subventions aux écoles dentaires	214,000	12%
Research, teaching and preventive dentistry conferences Conférences de la recherche, sur l'enseignement et de médecine dentaire préventive	172,789	10%
Dental students' conferences, table clinic programs and scholarships Conférences, cliniques sur table et bourses destinées aux étudiants dentaires	151,374	9%
Teacher training fellowships, scholarships, workshops and conferences for dental auxiliaries Bourses et subventions, ateliers et congrès pour les auxiliaires dentaires	108,306	6%
Special research project at the University of Toronto (funded by a Hospital for Sick Children Foundation Grant) Projet de recherche à l'Université de Toronto (financé par une subvention de la Fondation de l'Hôpital pour les enfants malades)	97,077	6%
Graduate and undergraduate accreditation surveys Enquêtes relatives à l'agrément des étudiants et des diplômés	74,000	4%
Lorne E. MacLachlan Endowment / Dotation — Teacher training awards Bourses pour la formation d'enseignants	73,560	4%
Dental library survey and other ACFD projects Etude relative aux bibliothèques dentaires et autres projets de l'AFDC	27,700	1%
Sundry awards Octrois divers	43,748	3%
TOTAL	**$1,743,269**	**100%**

Our records have been audited by Thorne Riddell.
A copy of their report is available on request.

La vérification de notre comptabilité a été effectuée par Thorne Riddell.
Une copie de leur compte-rendu financier sera envoyée sur demande.

1983 Honour Roll
Tableau d'honneur

Business, Industry and Dental Organizations

Entreprises, industrie et organismes dentaires

Founding Members / Membres Originaires

($10,000 and over - et plus)

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* Caulk, L.D. Company of Canada, Toronto, Ont.
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* Dentsply Canada Ltd., Toronto, Ont.
* Procter & Gamble Inc., Toronto, Ont.
Tri Dont Dental Centres

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Siemens Electric Ltd., Mississauga, Ont.

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* Canadian Dental Service Plans Inc., Toronto, Ont.
* Sybron Dental Products Division Canada (Kerr/Ritter), Mississauga, Ont.
* Wrigley Canada Inc., Toronto, Ont.

Supporting Members / Collaborateurs

($1,000 - $1,999)

A-Dec Inc., Newberg, Oreg.
* Alberta Dental Association, Edmonton, Alta.
* Canadian Academy of Restorative Dentistry
* Canadian Dental Association, Ottawa, Ont.
Clift's Dental Supplies Ltd., St. John's, Nfld.
* College of Dental Surgeons of British Columbia, Vancouver, B.C.
Cooper Laboratories Ltd., Mississauga, Ont.

Supporting Members / Collaborateurs

($1,000 - $1,999) (continued)

Crown & Bridge Study Club, Academy of Dentistry, Toronto, Ont.
* Dépôt Dentaire (Canada) Ltée., Montréal, Qué.
* Healthco (Canada) Ltd., Montreal, Que.
* International College of Dentists, Canadian Section, Toronto, Ont.
* Johnson & Johnson Inc., Montreal, Que.
* Ontario Dental Association, Toronto, Ont.
* Royal College of Dental Surgeons of Ontario, Toronto, Ont.
Shofu Dental Corporation, Menlo Park, Cal.
Teledyne (Densco, Getz, Hanau), Saratoga, Cal.
Teledyne Water Pik Canada, Rexdale, Ont.
* White, S.S. Dental Division, Etobicoke, Ont.

Contributing Members / Donateurs

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Butler, John O. Company, Guelph, Ont.
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* Coca-Cola Ltd., Toronto, Ont.
* Coe Laboratories Inc., Chicago, Ill.
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Guardian Insurance Company of Canada, Toronto, Ont.
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* Hygenic Corporation, Akron, Ohio
* Imperial Life Assurance Company of Canada, Toronto, Ont.
* Jelenko, J.F. & Company, Armonk, N.Y.
* Kodak Canada Inc., Toronto, Ont.
London Life Insurance Company, London, Ont.
* Manitoba Dental Association, Winnipeg, Man.
Mardan Business Systems Ltd., Waterloo, Ont.
* Nova Scotia Dental Association, Halifax, N.S.
* Novocol Chemical Mfg. Co. of Canada Ltd., Cambridge, Ont
* Posen & Furie Dental Laboratories Ltd., Toronto, Ont.
Reed Stenhouse Associates Ltd., Toronto, Ont.
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Seaboard Life Insurance Company, Vancouver, B.C.
* Williams Gold Refining Company of Canada Ltd., Fort Erie, Ont.

*Contributor for 10 years or more
*Donateur depuis 10 ans ou plus

Five ways to support CFDE — now and in perpetuity

CFDE is the only national, non-profit organization designed to secure funds for the promotion of good dental health through education, research and service.

To share CFDE's concern for the profession and the public, consider the following ways you can help:

- With an **annual unrestricted contribution.**
- With a **living memorial** honouring the memory of a friend, colleague or loved one.
- With a **tribute gift** to mark all the important events in the lives of those close to you.
- With a **bequest** in your will.
- With a **personal endowment**, now or in your will, for the benefit of dental health in perpetuity.

CFDE — your opportunity to serve the future of dentistry!

Cinq façons de contribuer au FCED — maintenant et à perpétuité

Le FCED est le seul organisme sans but lucratif, d'échelle nationale, qui recueille des fonds destinés à la promotion de la santé dentaire au moyen d'enseignement, de recherche et de services.

Vous pouvez partager l'intérêt que porte le FCED à la profession et au public des cinq façons suivantes:

- Grâce à une **contribution annuelle sans restrictions,**
- à un **don commémoratif** en mémoire d'un ami, d'un collègue ou d'une personne bien-aimée,
- à une **carte de témoignage** destinée à marquer une occasion spéciale dans la vie de ceux qui vous sont proches,
- à un **legs** dans votre testament,
- à un **fonds personnel de dotation**, maintenant ou dans votre testament, au profit de la santé dentaire à perpétuité.

Le FCED — il n'y a pas de meilleure façon de seconder la profession!

Subscribers / Adhérents

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* Alberta Dental Hygienists' Association
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* Newfoundland Dental Association, St. John's, Nfld.
Niagara Peninsula Dental Association, Niagara Falls, Ont.
North Toronto Dental Hygienists' Society, Willowdale, Ont.
Northwest Dental Laboratories Ltd., Vancouver, B.C.
* Ontario Dental Hygienists' Association, Hamilton, Ont.
Ontario Dental Nurses and Assistants Association, Accreditation Division, Weston, Ont.
Ottawa Dental Hygienists' Society, Ottawa, Ont.
* Pfingst & Company Inc., South Plainfield, N.J.
Premier Dental (Canada) Inc., Toronto, Ont.
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Ritter-Midwest, Des Plaines, Ill.
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* Royal Bank of Canada, Montreal, Que.
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Saskatchewan Dental Hygienists' Association, Saskatoon, Sask.
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* Sherwood Medical, St. Louis, Mo.
* Sterling Drug Ltd., Aurora, Ont.
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Although individual names are not listed, the Fund Trustees also wish to express their gratitude for the many smaller gifts received from various organizations.

Bien que les noms individuels ne soient pas cités, les responsables du Fonds désirent exprimer leur appréciation reconnaissante pour les nombreux dons plus modestes provenant de divers organismes.

1983 Honour Roll
Tableau d'honneur

Dentists
Dentistes

British Columbia / Colombie Britannique

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Pyrih, L., Selkirk
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Steidl, G.M., Dauphin
Watson, R.V., Dauphin
Yauck, E., Flin Flon
Yen, E., Winnipeg

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Wood, M.R., Winnipeg
Young, K.J., Pinawa
Anonymous

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Warren, R.C., Toronto
Wasserman, S.I., Scarborough
Yim, D.S., Toronto

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Begin, J.F., Gloucester
Bichay, W.F., Toronto
Black, W.R., Aurora
Blumenthal, A.M., Windsor
Boyko, A., Hamilton
Britton, J.E., Guelph
Bullen, M.E., Chatham
Cattran, C.F., Bowmanville
Chau, G., Toronto
Cherun, M.J., Ottawa
Chou, N.W., Windsor
Clappison, R.A., Toronto
Clark, W.R., Welland
Compton, F.H., Toronto
Cousens, G.M., Toronto
Dean, P.W., Barrie
Dunn, W.J., London
Earle, S.M., Ottawa
Ellis, R.G., Toronto
Fawcett, J.I.H., Lindsay
Feldman, A., Toronto
Fell, R.A., Lansdowne
Fenton, A.H., Toronto
Fisk, R.O., Toronto
Fleming, W.A.E., Toronto
Furlong, F.J., Windsor
Fuzy, S.J., Windsor
Gdanski, C.J., Grimsby
Gold, P.L., Toronto
Granat, H.A., Islington
Hare, G.C., Toronto
Harris, A.J., Komoka
Hegedus, S.E., Welland
Hicks, J.K., Hamilton
Holmes, B.W., Kenora
Hrabowsky, I., St. Catharines
Hudgins, W.B., Alliston
Ip, K.B., Mississauga
Ironstone, N.E., Ottawa
Ito, D.H., Toronto
Johnston, W.J., Martintown
Kenny, D.J., Toronto
Kerr, J.K., Scarborough
Kivlichan, W.F., London
Kochberg, M.H., Thornhill
Lamantia, P.D., Toronto
Lamping, J.D., Pembroke
Lawton, D.M., Harrow
Li, M.W., Ottawa
Lightford, H.G., Perth
Lightman, I., Toronto
Lin, C.G., London
Luks, E., Toronto
Malton Dental Group, Mississauga
Marcassa, J.M., Timmins
McCracken, J.H., Brampton
McGuire, B.G., Ottawa
McIntyre, T.R., Barrie
Medland, D.R., Milton
Merritt, R.D., London
Miller, D.R., Oshawa
Mills, W.H., Islington
Mitchinson, J.J., Niagara Falls
Moreau, M.E., Kitchener
Morin, P.P., Orleans
Morse, R., Toronto
Moskovitz, S., Rexdale
Munroe, C.R., Stratford
Oates, L.E., Chatham
Oler, C., Ottawa
Omura, D., Islington
Osepchook, D.B., Ottawa
Owen, A.M., Wawa
Paolasini, J.A., Grimsby
Peltoniemi, R., Thunder Bay
Petro, V.A., Hamilton
Pileski, R.C.A., Hamilton
Poulter, F.H., Thunder Bay
Pownall, K.F., Toronto
Purc, J.A., Minden
Rajczak, E.J., Hamilton
Richmond, J.E., Trenton
Rocci, F.M., Stoney Creek
Rotman, L., Richmond Hill
Rouble, G.L., Renfrew
Ruttan, C.G., London
Sandelli, J.R., Port Colborne
Scanlon, D.P., Penetanguishene
Schofield, I.D.F., London
Scott, P.A., Toronto
Segal, D., Toronto
Shanahan, S.P., Ottawa
Shykoff, J.C., Espanola
Slaney, J.R., Wallaceburg
Stasiak, R.E., St. Catharines
Stasko, J.G., Windsor
Stirling, G.C., Toronto
Suomela, K.R., West Hill
Tam, M.S.P., Burlington
Tonisson, A.M., Toronto
Vasiga, G.J., Kitchener
Walden, G.F., London
Watson, P.A., Don Mills
Watts, J.R., Cambridge
Willard, J.C., Chatham
Wilson, A.J., Windsor
Wintermans, T.A., Windsor
Woodall, G.L., Milton
Woods, C.E., Ottawa
Yadao, A., Oshawa
Yamaoka, R.H., Nepean
Young, C.L., Pembroke
Young, S.I., Toronto

MEMBERS / MEMBRES ($25 - $99)

Abbott, W.G., London
Abrahams, E.J., Ottawa
Albert, R., Ottawa
Allingham, R.L., Blenheim
Anderson, F.H., Collingwood
Annis, D.G., Guelph
Ante, E.H., Toronto
Anthony, C.L., Ottawa
Armstrong, J.D., Owen Sound
Armstrong, R.K., Ottawa
Asling, P.M., Uxbridge
Aurlick, N.W., Downsview
Babcock, J.K., Oakville
Baird, K.M., London
Bak, T.W., St. Catharines
Banting, W.A., Cloyne
Bartalos, R.S., Ancaster
Bates, P.A., St. Catharines
Beaton, W.D., London
Beauprie, D.J., Deep River
Begg, R.A., London
Beierl, C.D., Toronto
Bell, D.E., Ottawa
Bertrand, J.G., Ottawa
Birnbaum, S., Toronto
Black, H., Willowdale
Blackborow, D.R., Ancaster
Blackstien, B., Niagara Falls
Blackstone, J., Toronto
Boadway, D.N., Aylmer
Bobkin, A.D., Thornhill
Bodnar, M.P., Komoka
Bodo, N.L., Welland
Bodrug, W., Brampton
Bondarchuk, A., St. Catharines
Bossé, S., Cornwall
Boulos, N.N., Toronto
Boyes, M.G., Bracebridge
Bozek, R.G., Burlington
Bray, G.R., Meaford
Breglia, A.J., Toronto
Brockhouse, I.B., Hamilton
Brooke, R.I., London
Brookfield, J.R., Kirkland Lake
Browne, V.M., Toronto
Bruce, W.R., Kincardine
Bunt, R.D.H., Trenton
Burgess, G.E., Petrolia
Burgman, G.W., Kirkland Lake
Burgman, W.A., Cambridge
Burns, F.B., Islington
Caine, D.A., London
Cardinal, L., Cornwall
Carpenter, I.P.D., Nepean
Carroll, R.H., Orillia
Chalifoux, P., Sudbury
Chambers, D.B., Barrie
Chapnick, B.S., Toronto
Chapnick, G., Toronto
Charendoff, M.D., Willowdale
Chaytor, B.M., Oshawa
Chen, K.C., Hanmer
Clark, J.B., Tillsonburg
Cluett, A.W.E., London
Coburn, D.G., Hamilton
Cole, M.C., Peterborough
Collins, J.E., Simcoe
Coney, E.A., Waterloo
Connors, T.R., Oshawa
Cook, J.A., Brantford
Cook, P.A., Mount Brydges
Cook, W.F., Sudbury
Cooper, A.B., Scarborough
Cooper, M.L., Toronto
Corti, A.F., Sarnia
Coupland, J.G., Almonte
Cousins, D.E., London
Cox, T., Guelph
Coyne, I.M., Bracebridge
Crawford, A.H., Toronto
Crawford, R.R., Toronto
Cripps, C.N., Ottawa
Crockford, M.J., Bracebridge
Crowe, D.F., Barrie
Cunningham, R.H.G., London
Cunningham, W.R., London
Dagys, A.P., Scarborough
Daley, T.D., London
D'Aloisio, R.S., Sudbury
Diefenbacher, N.L., Kitchener
Dignard, J.A., Embrun
Dimitry, J.W., Willowdale
Dimitry, S.R., Willowdale
Di Ponio, M.I., Windsor
Doney, W.W.P., St. Catharines
Dort, L.C., Manitouwadge
Drysdale, D.M.J., Milton
Dulmage, D.D., Dunnville
Edelson, J.J., Toronto
Edwards, D.S., Hamilton
Ellis, B.G., Toronto
Evans, R.F., Picton
Farquhar, D.A., Marathon
Fawcett, C.J., Listowel
Feasby, W.H., London
Fedorenko, R.W., Southampton
Fedori, D.M.A., Thunder Bay
Fireman, S.M., Toronto
Fletcher, W.R., Sarnia
Florence, M., Toronto
Foster, D.W., Peterborough
Francis, D.B., Timmins
Freedman, H.L., Toronto
French, J.F., Ottawa
Froud, F.H., Toronto
Galbraith, R.H., London
Genier, D.V., Cochrane
Gifford, D.E., Ottawa
Gilbert, D.A., St. Thomas
Gilchrist, D.W., Kemptville
Glantz, G., Ottawa
Goldfarb, A.J., London
Good, C.N., Kitchener
Green, D.M., St. Thomas
Greenland, L.A., Scarborough
Groff, D.F., Ajax
Hamilton, R.M., Oakville
Harm, O., Toronto
Hartleib, P.C., Kitchener
Harvey, D.R., London
Hawthorne, K.J., Ottawa
Healy, P.J., Fort Erie
Heaslip, W.L., Toronto
Hedley, F.W., Ottawa
Hess, G.V., Windsor
Hinch, J.B., Toronto
Hoerner, F., Toronto
Hoffer, A., Thornhill
Hood, B.J., Toronto
Hornell, J.A., Chatham
Hucks, J.F.B., Peterborough
Hunter, H.A., Toronto
Hunter, R.J., Uxbridge
Hurst, E.R., Nobleton
Hussey, I.M., Toronto
Imperius, E., Thunder Bay
Jack, R.N., Kitchener
Jacobson, K.A., Thunder Bay
James, R.S., Simcoe
Johnson, L.K., Brampton
Johnston, H., Toronto
Jolley, H.M., Toronto
Jolly, J.W., Ottawa
Joslin, T.D., Hamilton
Jurczak, E.C., Richmond Hill
Kacinik, A.P., Toronto
Kan, K.M., Toronto
Karro, M.L., Toronto
Kay, J.E., Toronto
Kennedy, E.P., Windsor
Kenneger, C.M., Toronto
Knight, M.G., Kingston
Kohn, T.P., Downsview
Kovacs, E., Lindsay
Kozak, A.L., Hamilton
Kreutzer, J., Toronto
Kuo, C.K.C., Burlington
Kupeyan, H.K., Windsor
Lee, G.C., Zurich
Lehrer, J.M., Ottawa
Leuty, R.D., Toronto
Levine, N., Toronto
Levinson, K.I., Toronto
Lieberman, A.W., Toronto
Lingard, R.J., Grand Bend
Lipnowski, D., Ottawa
Listrom, R.D., Toronto
Little, G.E., Niagara Falls
Lysyk, G., Oshawa
MacDonald, R.A., Kincardine
MacInnis, R.J., Niagara Falls
MacKay, D.G., Port Elgin
Magee, R.L., Stroud
Main, J.H.P., Toronto
Main, P.A., Toronto
Malik, T., Burlington
Manilla, L.M., Willowdale
Manswell, H.B., Scarborough
Marcogliese, S.J., Hamilton
Marion, H.J., Pembroke
Maroosis, G., Kanata
Marsh, B.A., Sarnia
Martin, J.M., Toronto
Martin, R.F., Toronto
Mathany, D.S.C., Sarnia
Mathers, K.S., Kitchener
McColeman, W.J., Barrie
McDowell, D.M., Timmins
McGinn, J.R.A., Thunder Bay
McGinty, R.M., Windsor
McKegney, R.S., Toronto
McKenzie, D.J., Dundas
McNab, R.G., Port Perry
McParland, S.J., London
McQueen, D.T., Burlington
Mednick, S., Toronto
Meilus, V.J., Toronto
Mergl, J.P., Ottawa
Metcalfe, W.J., Simcoe
Mewha, R., Fort Erie North
Miles, J.R., St. Catharines
Moore, D.B., Barrie
Morrow, D.J., Borden
Morrow, G.M., Hamilton
Mumford, G.F., London
Natvik, A.M., Highgate
Neelands, M., Thunder Bay
Nelson, R.M., Peterborough
Nolan, D.R., St. Thomas
Norman, M., Ottawa
Noworolska, B., Toronto
O'Connor, D.J., Ottawa
Okun, C., Toronto
Oldfield, L.T., Cambridge
Olijnyk, B., Kitchener
Oliver, N.E., Ottawa
O'Neill, E.A., Kingston
Ostrega, K., Ottawa
Patterson, A.R., Kitchener
Pearlman, M., Sarnia
Pedlar, B.L., Burlington
Peloso, P.G., Kitchener
Peters, C.J., Ottawa
Peters, J.H., Goderich
Petrisor, A.J., Woodstock
Petroff, I.I., Toronto
Phillips, J.M., Oshawa
Pitkin, G.E., Agincourt
Plank, D.E., Hamilton
Popovich, F., Burlington
Porczynski, L.J., Toronto
Potashin, H.M., Toronto
Pritchard, J.S., Ottawa
Pudwill, D.H., Cambridge
Rawson, D.E., London
Reid, J.A., London
Rice, D.R., Waterloo
Riordan, P.J., Oshawa
Robertson, F.A., Thunder Bay
Robinson, B.W., Ottawa
Robinson, J.F., Pembroke
Rogers, L.W., London
Romanson, P.C., London
Rondeau, B.H.M., London
Rosen, S., Toronto
Rosenthal, S.E., Scarborough
Ross, H., Downsview
Ross, R.B., Toronto
Rowat, J.D., Ottawa
Rozeluk, M.W., Scarborough
Rudell, C.A., London
Sakarya, A.J., Toronto
Sakarya, M., Toronto
Santana, D.A., Sault Ste. Marie
Scott, G.K., Hamilton
Seetner, B.J., Toronto
Seto, T.W., Toronto
Shamess, E.J., Wawa
Shankman, L.V., London
Shaw, J.V.M., Midland
Sills, P.S., London
Simpson, B.A., Downsview
Slater, M.A., Downsview
Smith, T.M., Windsor
Smits, J., Markdale
Smyth, R., London
Snelgrove, J.M., London
Snider, D.E., Guelph
Southward, K.S., Beamsville
Speck, J.E., Toronto
Spence, W.J., Toronto
St. George, G.L., Sturgeon Fal
Starkovski, K.D., Scarborough
Stauffert, H.W., Barrie
Strain, D., Mississauga
Sullivan, C.B., Willowdale
Sunohara, P.T., Toronto
Sweetnam, G.H., Lindsay
Sybersma, D.T., Stratford
Szilock, R.S., Waterloo
Telch, F.E., Toronto
Thain, R.G.L., Embrun
Thompson, W.R., Trenton
Thomson, A.H., Toronto
Timmers, B.W., Ottawa
Tokiwa, J.T., Toronto
Tomkins, J.L., Windsor
Torneck, C.D., Toronto
Tropea, F.W., Toronto
Tso, D.M., Toronto
Tuch, L.H., Toronto
Tulumello, A.V., Welland
Vandahl, D.R., Petawawa
Vavra, J., Hanmer
Vogl, W.L., Toronto
Vtipil, O., Thunder Bay
Wachna, T.H., Windsor
Wagle, S.G., Milton
Wedderburn, M.M., Toronto
Weinberg, S., Toronto
Westman, F.C., Toronto
White, E.A., Scarborough
Whitely, A.R., Oakville
Williams, B., Brantford
Williams, J., Mississauga
Williams, L.A., Scarborough
Witchel, J., Toronto
Wong, D.G., Ottawa
Yakasovich, R.J., Sault Ste. Ma
Young, F.E., Don Mills
Yule, O.J., Willowdale
Zieba, E., Windsor
Zietsma, F.J., Burlington

Québec

PATRONS / BIENFAITEURS ($200 and over — et plus)

fontaine, J.G., Hull
France, J., Maniwaki
rner, E., Pointe-Claire
Michaud, G., Montréal
Werbitt, M.J., Montreal

HONOUR MEMBERS / MEMBRES D'HONNEUR ($100 - $199)

dams, J.R., Montreal
édard, R., Longueuil
égin, J., Montréal
ernier, L., Québec
oily, J.G., Montréal
aissie, J.M., Hull
amarda, A.J., Montreal
anonne, P., Westmount
outure, L.C., Pierrefonds
rowley, F.A., Longueuil
dmison, R.S., Montreal
armer, M., Pointe-Claire
ortin, J.M., Laval
ampel, P.C., Westmount
ead, T., Montreal
enne, R.E., Beaconsfield
hjah, M., Montréal
Kadowaki, R.S., Roxboro
Katz, I., Montreal
Lamarche, C., Laval-des-Rapides
Lemay, D., Sherbrooke
Lussier, L., St-Lambert
Maranda, G., Québec
Marcil, B., Ste-Thérèse-de-Blainville
Miller, S.I., Pointe-Claire
Pelletier, G., Montréal
Pion, S., Amqui
Poulin, Y., Ste-Foy
Poznak, G., Montreal
Rosen, H., Montreal
Roy, S., Ste-Foy
Turgeon, J., Montréal
Wainberg, A.S., Montreal
Wilson, H., Trois-Rivières

MEMBERS / MEMBRES ($25 - $99)

lbert, R.H., Montréal
llard, R., Pincourt
ndroutsos, E.A., Montreal
altadjian, H., Montréal
aum, H.M., Montreal
eaudet, C.A., Montréal
eiger, G., Montreal
élanger, L., Montréal
entley, K.C., Montreal
reault, C., Laval
rien, N., Montréal
yer, A., Montreal
apelle, M., Montreal
arrier, R., Val d'Or
ramer, L.L., Montreal
rutchfield, C.B., Quebec
adourian, M., St-Laurent
allaire, A., Greenfield Park
allaire, J., Lachute
allaire, S., St-Georges Est
alpé, A., Montréal
avid, R.J., Montreal
ésilets, J.F., Bromptonville
ewan, S.K., LaSalle
i Battista, M., St-Bruno
ion, G., Brossard
ion, M., Sillery
onohue, W.B., Montreal
orval, C., Montréal
ucharme, D., Montréal
ufault, R., St-Hubert
ufresne, R., Montréal
undass, D.M., Lachute
upéré, L., Amqui
upéré, P., Amos
uranleau, L.M., St-Bruno
mery, J.R., Montreal-West
erland, P.G., Pierrefonds
letcher, R.G., Montreal
ong Chong, J.R., Montreal
agnon, C., Métabetchouan
audreault, P., Ste-Foy
élineau, M.A., St-Jean
irard, A., Chicoutimi
reenblatt, M.M., Montreal
régoire Langevin, H., Hull
uimond, J., Montréal
ussow, W.B., Pointe-Claire
urley, R., Montreal
ean, P., Québec
etté, L., Val d'Or
ohnston, G.M., Pointe-Claire
nes, R.G., Montreal
ussaume, P.J., Montréal
Kandelman, D., Montreal
Kehoe, J.E., Pointe-Claire
Lafortune, M.A., Laval
Lafortune, M., St-Jérôme
Lamothe-Mian, G., Montréal
Laperrière, J., Longueuil
Larocque, J., Val d'Or
Larose, P., Cartierville
Laurin, A., Pierrefonds
Lavallée, L., Longueuil
Lebel, S., St-Félicien
Leclerc, C., Montréal
Legault, B., Gaspé
Leith, D.R., Dorval
Lussier, J.P., Montréal
MacDougall, G., Lennoxville
Maliska, J., Montreal
Marchand, L., La Tuque
Margolese, I., Montreal
Mentha, J., Baie James
Mercier, P., Fermont
Messier, Y., Repentigny
Meunier, R., St-Bruno
Millar, E.P., Montreal
Minville, P.R., Beauport
Monast, R., Cowansville
Monastesse, J.P., Montréal
Monette, J.R., Montréal
Munro, D.J., Montreal
Montminy, D., Greenfield Park
Morand, M.A., Sillery
Moscovitch, M.S., Westmount
Muroff, F.I., Montreal
Orawiec, R.J.B., Aylmer
Paradis, R., Rouyn
Pinchuk, M., Westmount
Prud'Homme, P.P., Shawinigan-Sud
Provost, A., Chomedey, Laval
Rapoport, R.H., Montreal
Rennert, M.D., Montreal
Richer, A., Terrebonne
Robichaud, H.M., Montréal
Rondeau, A., Montréal
Rouillard, G., Sherbrooke
Savard, A., Farnham
Schneider, G., Montreal
Shapiro, A., Montréal
Shevell, M., Montreal
Silver, I.I., Montreal
Simard, Y., Louiseville
Spira, A., Montreal
Staples, P.C., Montreal-West
St-Martin, H., Pointe-aux-Trembles
Tardif, N., Ste-Foy
Taylor, D., Montreal
Tekela, A., Montreal
Tessier, B., St-Marc des Carrières
Théorêt, Y., St-Timothée
Toeman, A., Verdun
Toudjian, T., Montréal
Traversy, M.C., St-Hubert
Trépanier, M., Farnham
Trépanier, P., Farnham
Varin, R., Cap-aux-Meules
Viau, N., Pointe-aux-Trembles
Vigneault, D., LaSalle
Vincelli, R., Montreal-West
Weinlander, G.H.G., Montreal
Wilkins, M.A., Dorval

Atlantic Provinces / Provinces de l'Atlantique

PATRONS / BIENFAITEURS ($200 and over — et plus)

Bennett, I.C., Halifax, N.S.
Bonang, D.M.J., Halifax, N.S.
Eisner, D.A., Halifax, N.S.
Hewitt, G.M.W., Gander, Nfld.
Jensen, G.M., Halifax, N.S.
MacInnis, E.L., Halifax, N.S.
Peters, D.K., St. John's, Nfld.
Turner, G.G., Glace Bay, N.S.
Anonymous

HONOUR MEMBERS / MEMBRES D'HONNEUR ($100 - $199)

Anderson, H.D., Halifax, N.S.
Archibald, L.J., Halifax, N.S.
Ball, R.W., Grand Falls, Nfld.
Bannerman, R.A., Halifax, N.S.
Barrett, G.D., Charlottetown, P.E.I.
Barro, W.B., Dartmouth, N.S.
Butler, D.G., St. John's, Nfld.
Chaytor, D.V., Halifax, N.S.
Christie, J.S., Bedford, N.S.
Cochrane, L.E., Dartmouth, N.S.
Coffin, R.D., Charlottetown, P.E.I.
Conrod, A.L.B., Sydney, N.S.
Conrod, C.M., Sydney, N.S.
Cormier, P.E., Moncton, N.B.
Cudmore, D.R., Saint John, N.B.
Duffy, L.I., Charlottetown, P.E.I.
Faulkner, G.H., Halifax, N.S.
Filbee, J.F., Halifax, N.S.
Findlay, J., Halifax, N.S.
Fitzpatrick, D.A., Saint John, N.B.
Franklin, E.M.C., Rockingham, N.S.
Green, W., St. John's, Nfld.
Horsman, H.W., Riverview, N.B.
Hunt, B.D., Lewisporte, Nfld.
Johnston, B.G., Truro, N.S.
Logue, J.W., Wolfville, N.S.
MacDonald, E.S., Antigonish, N.S.
MacDonald, G.R., Mount Pearl, Nfld.
MacLeod, D.E., Kentville, N.S.
Maguire, M.J., St. John's, Nfld.
Pentz, R.W., Armdale, N.S.
Porter, P.J., Charlottetown, P.E.I.
Precious, D.S., Halifax, N.S.
Rector, W.R., Hampton, N.B.
Romcke, R.G., Charlottetown, P.E.I.
Shaffner, V.B., Halifax, N.S.
Smith, E.L., Halifax, N.S.
St-Onge, E., Grand Falls, N.B.
Trend, J.P., Grand Falls, Nfld.
Vogan, W.I., Halifax, N.S.
Weaver, W.H., Saint John, N.B.
Wenn, R.D., Charlottetown, P.E.I.
Wowchuk, J.A., Saint John, N.B.

MEMBERS / MEMBRES ($25 - $99)

Amys, P.W., Halifax, N.S.
Baird, D.G., Halifax, N.S.
Binder, D.J., Hantsport, N.S.
Boucher, D., Moncton, N.B.
Boudreau, H.G., Digby, N.S.
Bradley, G., Sackville, N.S.
Britt, D.L., Saint John, N.B.
Brogan, H.W., Dartmouth, N.S.
Brunet, P., St. Eleanors, P.E.I.
Byers, D., New Glasgow, N.S.
Camp, W.S., Lower Sackville, N.S.
Chernin, S., Halifax, N.S.
Christie, R., Fredericton, N.B.
Conrad, G.M.D., Dartmouth, N.S.
Corrigan, A.E., Parkdale, P.E.I.
Creaser, B.A., New Germany, N.S.
Daly, C.P., St. John's, Nfld.
Davis, B.C., Halifax, N.S.
De Ware, R.B., Moncton, N.B.
Dexter, C.E., Halifax, N.S.
Dexter, E.F., Halifax, N.S.
Doiron, J.A., Charlottetown, P.E.I.
Dombowsky, L., Halifax, N.S.
Eisner, J.E., Halifax, N.S.
Ervin, A.H., Dartmouth, N.S.
Flynn, J.J., St. John's, Nfld.
Furlong, R.F., St. John's, Nfld.
Gushue, T.J., St. John's, Nfld.
Hodgson, J.G., Charlottetown, P.E.I.
Hoffman, A.E., Halifax, N.S.
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Ingham, T.D., Halifax, N.S.
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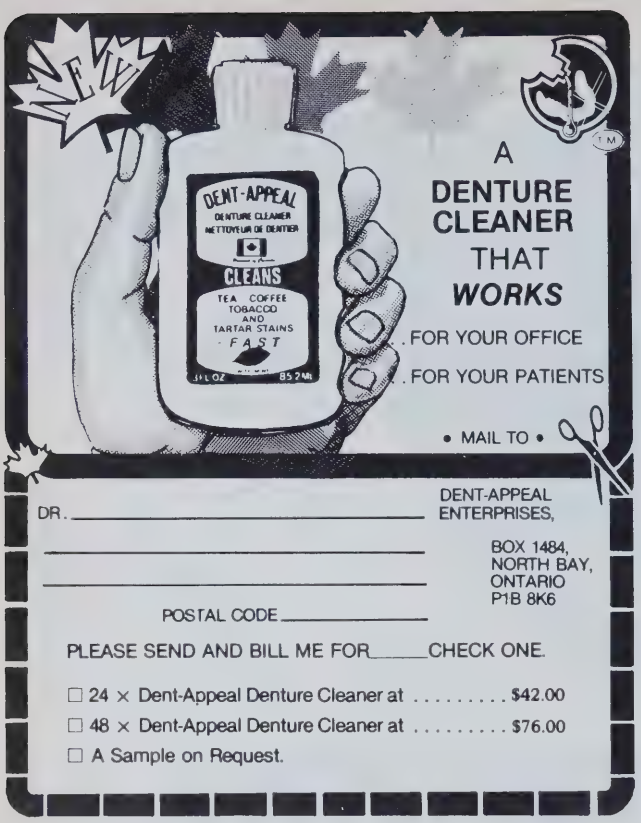

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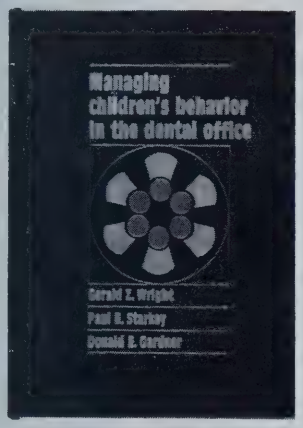

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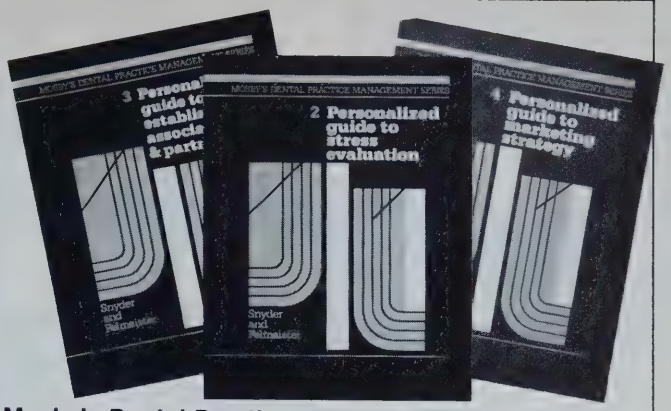

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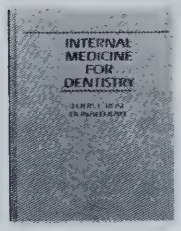

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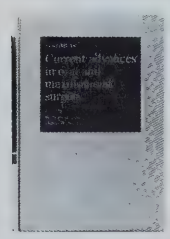

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THE CLINICAL TREATMENT OF DENTAL CARIES IN THE FUTURE?

James P. Carlos, DDS
National Caries Program
National Institute of Dental Research
Bethesda, Maryland

ABSTRACT

The title of my presentation has been posed as a question. Obviously it is a question which is of crucial importance to all practitioners who deal with the clinical treatment of dental caries and its sequelae. My impression was that the organizers of Symposium 25 expected me to suggest an answer: "Yes," "No" or "Maybe."

Interestingly, the answer (which, by the way, is "Maybe") depends as much or more upon dental practitioners and their patients as it does upon dental research; I will try to show you why this is so by suggesting a simple theoretical framework for the link between basic research and clinical practice, together with a few examples to illustrate the connections.

Traditionally, dental research and dental practice have been considered as separate activities, sometimes fraternal—more often like distant cousins, with only the common milieu of the oral tissues and oral functions to connect them. Practitioners of one science often have not understood the language, let alone the goals and problems of the other. Nevertheless, whether we realize it or not in our day-to-day work, there is a very close and unavoidable linkage upon which we all, researchers, practitioners, and especially patients, ultimately depend.

To appreciate this linkage, I suggest that we not consider dentistry as a conglomerate of research, education, materials, general practice, various specialties, and so forth, but as a single system of knowledge. This concept is illustrated in **Figure 1**.

RÉSUMÉ

La question formulée dans le titre revêt évidemment une importance cruciale pour tous les praticiens qui soignent des caries et leurs séquelles. Lors du Symposium du 25e anniversaire de la Faculté dentaire de l'Université du Manitoba, j'ai eu l'impression que les organisateurs voulaient que je réponde à cette question par un oui, un non ou un peut-être.

Fait intéressant à noter, la réponse—en passant, c'est: peut-être—dépend autant, sinon plus des praticiens dentaires et de leurs patients que de la recherche en dentisterie. Je vais tenter de montrer pourquoi en proposant un plan de travail théorique simple qui établit un lien entre la recherche fondamentale et l'exercice clinique et en offrant quelques exemples pour illustrer le tout.

Traditionnellement, on considère la recherche dentaire et l'exercice clinique comme deux fonctions distinctes. Parfois, on pense qu'ils sont connexes, mais le plus souvent, on les imagine comme deux cousins éloignés qui ont seulement en commun les fonctions et les tissus buccaux. Il arrive parfois que des adeptes d'une science ne comprennent pas le langage des adeptes de l'autre, sans parler des objectifs que ceux-ci peuvent poursuivre et des problèmes qu'ils tentent de résoudre. Néanmoins, que nous nous en rendions compte ou non dans notre travail quotidien, il y a un lien très étroit et indéniable duquel, en fin de compte, nous, les chercheurs, les dentistes et les patients surtout, dépendons tous.

Pour reconnaître l'importance de ce lien qui nous unit, je suggère que nous ne considérions pas la dentisterie comme un ensemble dans lequel on peut distinguer la recherche, la formation, les matériaux, l'exercice général, diverses spécialités et ainsi de suite, mais comme un seul ordre de connaissance.

I would like to spend some time considering the implications of this admittedly oversimplified model. To begin with, a few superficial observations about the diagram:

First we notice that the system is composed of several distinct stages, connected by arrows. The arrows imply movement of knowledge from stage to stage; thus the system is dynamic.

Secondly, assuming the system functions, it provides a direct path from basic research to clinical practice to the treatment of the patient, which is not only the main point of the model but, incidentally, makes my paper at least seem to be relevant to the title in the program. There is also a subsidiary path in the system; I shall return to this in a moment.

Finally, as you see, there is a "feedback loop" in this model of dentistry, by which clinical practice also influences research. This may not be obvious until we consider, to take one example, how the needs of practitioners for restorative materials that are more durable, esthetically satisfactory and less expensive, have stimulated basic research in dental metallurgy and polymer chemistry.

So much for general considerations. We

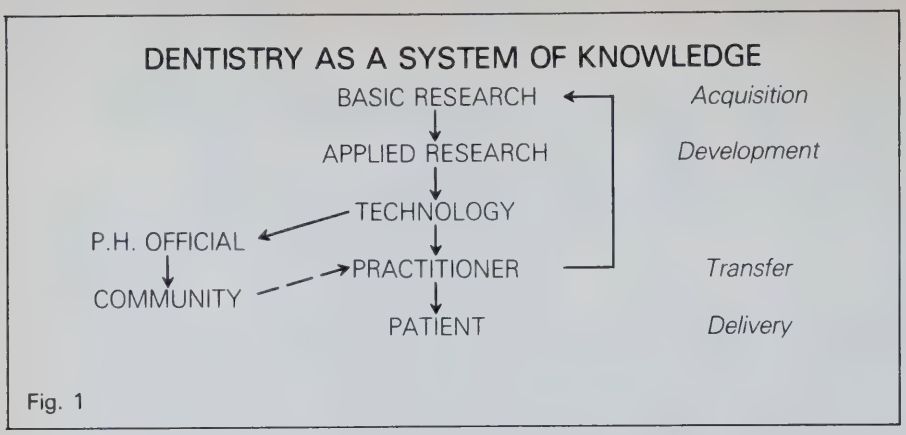

Fig. 1

may now ask what are the crucial events and linkages in the system if knowledge is to move through it; that is, if basic research is going to affect the clinical treatment of dental caries. Clearly, there are several; as many, in fact, as there are downward pointing arrows in the diagram.

But before any movement of knowledge can occur, basic research, to fulfil its role, must acquire new information about the causes of dental diseases and provide at least some hints as to how these pathologic processes can be attenuated or prevented. In the case of dental caries, basic research has provided a rich body of information about the physiology and pathogenicity of oral microorganisms; the way in which they interact with sugars from the diet, with proteins from saliva, and with each other; about the complex effects of fluoride upon bacteria and tooth structure; and about the nature of the caries lesion itself, at the microscopic and molecular levels. All of these basic facts have led to ideas about possible methods of caries prevention. We can confidently expect that basic research will continue to produce new leads to prevention by, for example, unravelling the complexities of bacterial adhesion to enamel and by providing a better understanding of the secretory immune system.

However, except for some dramatic serendipitous breakthrough, which I do not expect, basic research will never affect clinical treatment of caries directly because newly acquired basic knowledge usually must pass through a stage of translation, refinement and development. This is the role of applied research, and it is the first critical linkage in the system.

Typically, applied research involves several levels of activity, each dependent upon successful completion of the one before it. For example, we may acquire information about the peculiar metabolic requirements of cariogenic microorganism which suggests that it may be sensitive to a particular type of antimicrobial compound. A series of test-tube experiments are then carried out to confirm this, and to establish the minimum inhibitory dose. We then test the compound against dental caries in animal models while, at the same time, gathering preliminary information on toxicity. If the results of the experiment are satisfactory, we move to controlled clinical trials in humans (which usually require three phases of testing in themselves) and, finally, to demonstrations of the compound plus delivery regimen in the clinic or the community. Along the way we make further observations about safety, cost, delivery systems and patient acceptance.

Only if all these steps are successfully negotiated do we have an end product. This product can be called a technology. Relatively few ideas generated by basic research ever reach this stage and, considering the complexity and cost of the developmental research, and the stringency of criteria for success at each stage, it is remarkable that *any* do! And yet, even when we have advanced some new knowledge to this point, we are far from finished.

The technology must now be transferred to the clinical practitioner. Notice that I say "transferred," not "transmitted." It is a very different matter to simply *tell* practitioners about a new technology for prevention or treatment of caries than it is to have the practitioner accept and deliver that technology to the patient. This is why I said earlier that the successful functioning of this model of dentistry depends upon the practitioner, perhaps even more than upon the researcher. Both transfer and delivery are crucial linkages in the system, and they are more subject to breakdown than any others. I will give examples shortly.

First, we have to examine the alternative path in the diagram. This path is followed when a technology is transferred mainly to the arena of public health dentistry, rather than to clinical practice. In the past this has occurred with community and school water fluoridation and school-based fluoride mouthrinse programs. This will occur whenever it appears more feasible and cost-effective to deliver the technology *en masse*, than in a one-to-one, practitioner-to-patient mode. Usually this path of transfer is limited to preventive technologies. I hardly need tell you that such a path may have a profound, if indirect, effect on clinical practice, simply by reducing the number of patients who present themselves for treatment. This is, of course, a situation that is occurring at this moment because of the recent decline in caries prevalence among children which, I am persuaded, is primarily attributable to widespread use of fluorides by individuals and in public health programs. The effect of this is represented by the arrow from "community" to "practitioner." This arrow is dashed, because it does not represent knowledge transfer and therefore is not a linkage congenial to my model. Nevertheless it obviously has been an extremely important link, arguably the *most* important link, between research and the treatment of caries in dental offices.

The final link in the system is the one of greatest direct interest to practitioners—the application of new knowledge or technology to the patient for the prevention or treatment of dental caries. As this is a process about which most of you are far better informed than I, I will say only that if this linkage fails to occur, all previous efforts have been futile.

Now I would like to illustrate these concepts by following the development of a particular preventive method through the system called "dentistry."

During the 1960s there was extensive basic research to acquire knowledge about the interaction of adhesive compounds with biologic tissues. From this work emerged the idea that an adhesive might be used to seal the pits and fissures of posterior teeth against caries and, by the late sixties, the class of polymers called "bis-GMA," used in combination with acid etching of enamel, appeared to have potential for this purpose. Following early developmental work by Rafael Bowen and colleagues at the U.S. National Bureau of Standards, a successful pilot clinical trial of a bis-GMA sealant was conducted by Michael Buonocore at the Eastman Dental Center in Rochester.

This was followed by several larger trials, involving over 5,000 children in all. The results showed that, with proper technique of application, sealants could be retained on occlusal surfaces of teeth for five years or even longer, and that their effectiveness in preventing dental caries approached 100 per cent. Along the way we acquired collateral information about the cost and safety of sealants, and on improved techniques for their application. All this was widely reported in dental journals and, of course, by representatives of dental supply companies.

Therefore in 1974, in a survey of the preventive practices of U.S. dentists, we asked about their use of adhesive sealants. Only 25 per cent of dentists said they were using sealants in their practices. The reasons given for not using sealants included: "sealants do not last in the mouth"; "they have not been proved effective by research" and, "it is risky to inadvertently seal over a caries lesion".

In the years following, many more clinical trials of sealants were reported from several countries which, in general, reconfirmed earlier findings of efficacy and which, in particular, demonstrated that acid-etching did not increase the susceptibility of a tooth to caries and that existing caries did not progress under a sealant. It seems inconceivable that by 1980 any practitioner had not had the opportunity to acquire this information. Yet, when we repeated our survey of preventive practices in that year, the percentage of dentists who said they used sealants, even "occasionally," had increased to only 57 per cent, and only 9 per cent of respondents said they routinely provided sealants for most of their child patients. The main reasons given for not using sealants? "Don't last in the mouth"; "not proved by research," and "danger of sealing over caries"!

What observations can we make about this scenario? First, of course, that knowledge acquired from basic research did not reach the patient, at least not as completely as it might have. Evidently the problem occurred at the arrow which symbolizes technology transfer, a link in the system which, as I said earlier, seems especially weak and subject to breakdown. There is little doubt that knowledge was transmitted (though not necessarily in the most effective way), but in many cases it was either not received or, if received, not applied. This idealized system called dentistry did not function properly.

There is an additional observation which can be made about this illustration which has practical and ethical overtones. To the extent that a new preventive technology, developed by thorough research, fails to fully reach the patient, caries occurs which need not have occurred. The patient has been denied a health benefit and, because frank caries is irreversible, that benefit can never be restored; we can never "make up for" this malfunctioning of our system. That is an idea worth serious thought.

How long will it take to transfer the knowledge that early caries lesions can be arrested or even "cured" by fluorides, and how many unnecessary restorations will be placed before this knowledge is routinely applied in clinical practice? It is a question requiring close scrutiny during the next few years.

I should mention another closely related example of a new technology that is currently at an advanced stage of applied research and may soon be ready for transfer to clinical practice; this involves a new method of delivering fluoride using a system of controlled-release chemotherapy.

A good deal of basic research on the mechanism of action of fluoride has suggested that one way by which this ion protects against caries is by interfering with the ability of oral bacteria to convert sugars to acids. Another mechanism is by the uptake of fluoride ions by enamel to repair very early, subclinical caries lesions. The important results of this research have been the demonstration that both these processes are active in the presence of extremely small concentrations of fluoride but, to be optimally effective, this fluoride must be available at the enamel-plaque interface more or less continuously.

In an attempt to achieve constant low levels of fluoride in plaque, while minimizing both inconvenience to the patient and time required of professional personnel, a fluoride controlled-release device has been developed. This device is fabricated from polymers and can be cemented to a tooth, incorporated into orthodontic appliances and so forth. The device is designed to continuously release precise amounts of fluoride for periods up to six months without attention by either the patient or the practitioner.

In early clinical trials, these controlled-release devices have functioned well, and we expect to begin final trials during the coming year. After that, the critical point will be reached: the transfer of this technology to clinical practice. We shall have to wait to see how well that linkage will function in this case.

Finally, I would like to say something useful about how the functioning of dentistry as a system of knowledge might be made more efficient and foolproof; how the linkages can be made more immune to failure. Unfortunately, I do not know the answer, though I think it may be found by paying closer attention to this phenomenon called technology transfer.

The ways in which new research knowledge diffuses into routine clinical practice have been the subject of much recent research attention, although usually the system used for study has been medicine, not dentistry. Even so, this process remains poorly understood. Some research suggests that technology transfer is catalyzed when practitioners come together in settings wherein there is pressure for rapid technological change, such as in modern hospitals. If this is so, then dentistry, with our traditional pattern of solo or small group practices, may have special problems to solve which have not yet been sufficiently addressed.

In any case, there is little doubt that the process of *transmitting* new information from the domain of research to that of the practitioner can be improved. I believe that the critical information usually has been transmitted, but I know that this has been done in an *ad hoc* way, such as through journal articles, conferences and the popular media, with no attempt to systematize the process, and very few attempts to evaluate the effectiveness of the transmissions. This process can and must be more formally organized in the future.

I have no idea how we might ensure the reception of this knowledge by dental practitioners, let alone its application to patients. There seems no way around this problem except to state the platitude that it is the personal responsibility of every clinician to consciously recognize his or her role in this regard and to attempt to make certain that his clinical practice is based upon the latest available results of research, modifying or abandoning previous concepts and techniques whenever necessary. I assure you that we in the research community would be very receptive to any ideas that would improve technology transfer.

Of course, as I said earlier, this construct of what we call dentistry is an oversimplified one. I have avoided such critical topics as individual attitudes and societal priorities about dental health, and the economic variables which affect both the decision to seek treatment and the support of dental research itself. These factors are obviously potential causes of breakdown in the system and sometimes have caused such breakdowns. However, they are not outside of the system, they are part of it. With a few more stages and arrows, these and other variables could easily be incorporated into the model—but I leave that exercise to you.

By now I trust it is clear why the question "Can Basic Research Influence the Clinical Treatment of Dental Caries in the Future" can only be answered, "Maybe". The system to permit this to occur is in place. We hear about some exciting and provocative activities in caries research that may soon reach those critical thresholds of technology transfer and delivery. Whether they will actually reach the patient depends heavily upon all of us, and how well we recognize and carry out our respective roles.

That dental research and dental practice on this continent have a rich and proud record of accomplishment is self-evident. The system of knowledge called dentistry, whatever its imperfections, does function. My message is a simple one: by our collective efforts and diligence we can make it function even better in the future.

TRANSPOSITION OF TEETH

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ABSTRACT

Ectopic eruption of teeth is not a rare occurrence.[2] Premature loss of deciduous teeth with subsequent mesial drifting of erupting permanent teeth is found often in general practice. First permanent molars that erupt under the distal aspect of second deciduous molars are seen from time to time in the maxilla. A less commonly found type of ectopic eruption is transposition – the exchange of positions of two contiguous teeth. This abnormal situation, although familiar to most dentists, is not as well documented in the literature as might be expected and for this reason the following are reported.

SOMMAIRE

L'éruption ectopique des dents n'est pas rare. En dentisterie générale, on observe souvent, à la suite d'une perte prématurée des dents temporaires, une migration des dents permanentes en direction mésiale lorsque celles-ci font éruption. En de temps à autre, le maxillaire supérieur présente des molaires permanentes qui font éruption distalement, c'est-à-dire à la place des deuxièmes molaires temporaires. La transposition constitue un genre d'ectopie moins fréquent. Dans ce cas, deux dents voisines font éruption l'une à la place de l'autre. Cette anomalie, la plupart des dentistes la connaissent, bien que la documentation à ce sujet soint moins abondante qu'on pourrait le souhaiter. Tel est précisément le propos du présent rapport.

INTRODUCTION

Case 1. A.F., a 23-year-old male was seen at the College of Dentistry on January 16, 1982. On examination it was found that the maxillary right canine and first premolar were transposed in the arch. Both the deciduous right canine and lateral incisor were retained. There was no radiographic evi-

Fig. 1. *The maxillary right permanent canine and first premolar have exchanged places. The deciduous canine and lateral incisor are retained. There is no evidence of the permanent lateral incisor.*

Fig. 2. *Transposition of the mandibular left second premolar and first permanent molar. The second deciduous molar is retained.*

dence of the maxillary permanent right lateral incisor (**Fig. 1**). Since there was no problem with function, no treatment for the transposition was undertaken.

Case 2. M.A.J., a 33-year-old man presented at the College of Dentistry for routine treatment. During examination, transposition of the 35 and 36 was noticed (**Fig. 2**), but no treatment was deemed necessary or possible.

DISCUSSION

Abnormal paths of eruption for teeth are not rare.[1,2] Mesial shifting of first molars during eruption is often seen, resulting in impaction of these teeth or premature loss of deciduous molars. Transposition, the form of ectopic eruption that involves the exchanging of places between two teeth, is not so common and few cases are reported in the literature.[3,4]

One of our cases involved the canine and first premolar. Abbot and Suirsky[3] also reported a case involving the canine, but in the mandible. Ruprecht had one previous case involving the maxillary canine and lateral teeth bilaterally in one female patient. Poyton[5] described transposition of the canine and stated that the premolar or lateral incisor is the other tooth most often involved. This seems to be borne out by Ruprecht and co-workers[6] who in another research study involving over 1400 patients, found two cases, both involving the maxillary canine and first premolar. The mandibular premolar and first molar do not appear to be as frequently involved. We report one case involving the left second premolar and first molar. The only other case reported in the literature involved a supernumerary premolar and the first molar.

SUMMARY

Two cases of transposition of teeth are presented. Although not a common occurrence, judging by the literature, one of our cases seems to be the more frequent form, whereas the other involves more rarely associated teeth.

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AN EFFECTIVE ELIXIR FOR BEHAVIOURAL MODIFICATION OF THE CHILD DENTAL PATIENT

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INTRODUCTION

When nitrous oxide was introduced to the dental profession during the last century, practitioners of that day believed that a complete solution to dental behavioural problems had been discovered. However, it soon became apparent that some side effects prevented its widespread use. Consequently, the search for the ideal drug has continued ever since, and we have seen the rise and fall in popularity of many preparations over the past 100 years.

In recent times, the tranquilizers have shown some promise. Developed originally for treating psychotic patients, it was found that everyday tension could be relieved by weak preparations such as diazepam (Valium) or chlordiazepoxide (Librium*). These preparations were found to be marginally successful in serving the needs of the dental patient but did not relieve the symptoms of severe anxiety. In short, most of these preparations do not work in enough cases to be useful. Tobias, Lipschultz and Album[1] tested several combinations of drugs and found that effectiveness ranged from 44 per cent to 67 per cent – not effective enough for routine use.*

SOMMAIRE

Au siècle dernier, lorsqu'on a introduit l'usage du protoxyde d'azote en dentisterie, les praticiens d'alors ont cru qu'on avait découvert une solution définitive aux problèmes de comportement dentaire. Toutefois, on s'est vite aperçu que des effets secondaires en rendaient impossible un usage général. C'est pourquoi on a continué depuis ce temps à chercher une drogue idéale et, au cours des cent dernières années, on a pu voir de nombreuses préparations connaître une vogue plus ou moins passagère.

Cependant, les tranquillisants offerts sur le marché dernièrement présentent quelque espoir. D'abord mis au point pour traiter les psychotiques, des médicaments plutôt faibles comme le diazépam (Valium) ou le chlordiazépoxide (Librium*) peuvent, a-t-on découvert, soulager la tension quotidienne. On a appris que ces préparations répondent un peu aux besoins du patient dentaire, mais ne soulagent pas les symptômes de grave anxiété. Bref, la plupart de ces médicaments sont efficaces dans trop peu de cas pour être vraiment utiles. Tobias, Lipschultz et Album ont testé plusieurs mélanges de drogues et découvert que ceux-ci sont efficaces dans une proportion de 44 à 67 pour cent seulement, ce qui n'est pas suffisant pour l'usage ordinaire.*

RESEARCH

Several drugs and combinations of drugs[1] were tried by the author and discarded as not being adequately effective or as having adverse effects. In 1973, at the suggestion of a psychiatrist, a tranquilizer, methotrimeprazine (MTM) (Nozinan**) was tried but at first seemed to have undesirable side effects – nausea, syncope and postural hypotension. However, when this drug was combined with a minor tranquilizer, hydroxyzine (Atarax†), several of the side effects almost disappeared. The incidence of nausea and syncope dropped to near zero, but the postural hypotension, although reduced, still presented a problem; one out of approximately 30 children given this combination became dizzy and unable to stand upright without feeling faint.

The observed symptoms of hypotension, such as pallid appearance and dizziness, could be considered mild, as they were transitory and the patient regained consciousness almost immediately after lying down, and could stand upright unassisted within 15 – 30 minutes of the initiation of the symptoms. Blood pressure was not taken on these children because the symptoms disappeared almost immediately.

A careful questioning of the parents revealed that those children with adverse effects had not eaten prior to administration of the drug. This prompted the author to advise all mothers to make sure their children had eaten immediately prior to taking the "medicine". The incidence of side effects again diminished, although one out of 50 still showed signs of drug-induced hypotension. At this point, each mother was told to make sure that the "medicine" was taken *with food* plus a glass of milk *containing two teaspoonfuls of sugar*. Eventually, it was discovered from reports of parents that chocolate milk was the easiest and most reliable form of milk to be given with the "medicine".

The incidence of side effects other than drowsiness almost completely disappeared when instructions were followed carefully. Occasionally, however (about one in 2000 patients), the symptoms of hypotension still occur – pallid appearance, sweating, syncope and sleepiness, which again are controlled within 15 to 30 minutes by having the patient lie down, and adminis-

*Hoffmann-La Roche Limited
**Rhone-Poulenc
†Pfizer Canada Inc.

TABLE I

Postoperative care of a child who has received sedative

1. Keep the child under constant supervision.

2. Your child may sleep for as long as four hours upon returning home from the dental office. Do not be alarmed as this is a common occurrence.

3. Your child should be easily aroused even during a postoperative sleep.

4. A slight drop in blood pressure is a common occurrence and produces a white, pallid appearance. Should this happen, give your child additional foods containing sugar, such as chocolate milk, chocolate bar, ice cream, etc. and make sure that the patient is kept lying down.

5. Under no circumstances should your child be allowed to wander around dangerous areas such as stairways, etc. without being supervised, for at least four hours.

TABLE II

The effect of methotrimeprazine and Demerol on heart and respiratory function

	MTM	Demerol
Heart rate increase	6-12%	20-27%
Respiratory rate increase	4-10%	28-40%
Blood pressure	decrease	increase[13]

TABLE III

Availability of metrotrimeprazine by country

Country	Generic name	Trade name	Manufacturer
Canada	MTM oral drops	Nozinan	Rhone-Poulenc
U.S.A.	MTM injectable	*Leveprome	Lederle
England	Scored tablets	Veractil	May and Baker
France	MTM oral drops	Nozinan	Rhone-Poulenc

*No longer available in the United States

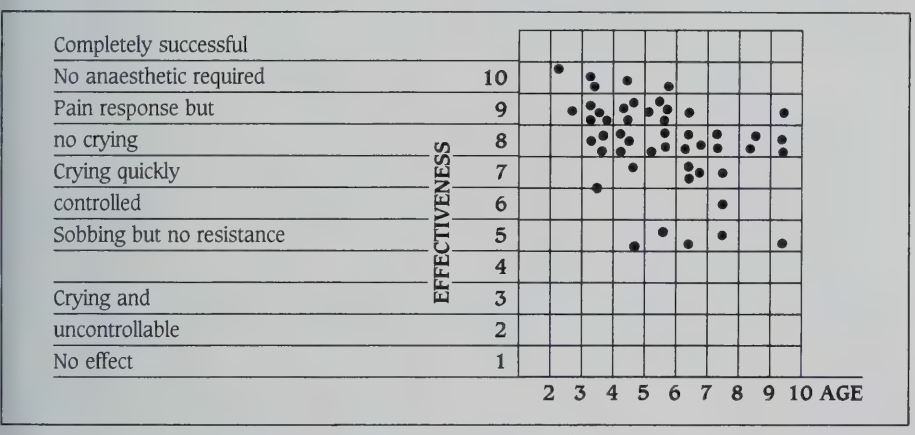

Fig. 1. *The observed reactions of 50 patients aged 2 – 9½ years, treated with methotrimeprazine and hydroxyzine.*

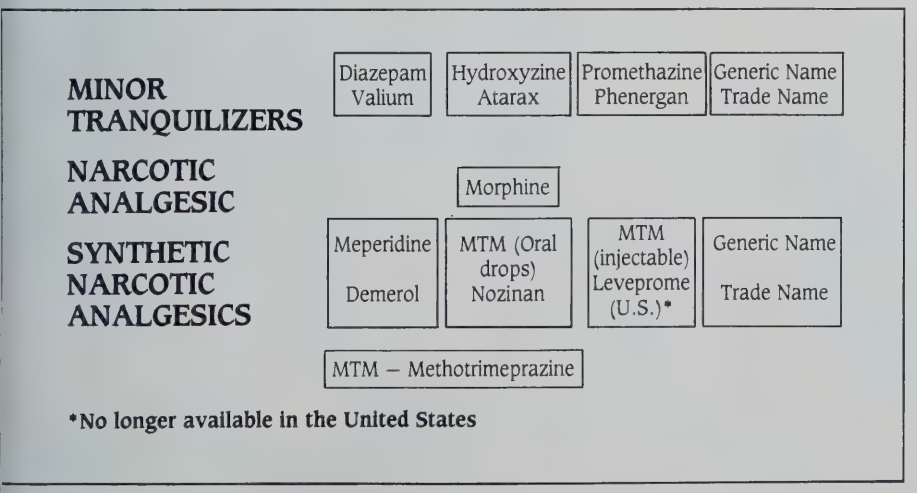

Fig. 2. *Drugs used for behavioural modification in dentistry.*

tering another drink of milk and sugar. None of the patients has been so sleepy that he or she could not be aroused easily. Upon release, the mother is advised to keep the child in a prone position as long as symptoms persist and to expect the child to sleep intermittently for the next four hours. A list of instructions is given to each parent (**Table 1**).

In contrast to other drug combinations, the effectiveness of MTM and hydroxyzine is very positive. All children given this medication showed symptoms of drug action, some to a higher degree than others. On a scale of 1 to 10 (**Fig. 1**), the effectiveness, on average, would be about eight, with 10 per cent at the five level and 10 per cent at the 10 level. Clinically, it can be observed that patients at level five still require a limited use of behavioural modification techniques, while those in the top 10 per cent are so cooperative that dentistry can be performed without strain or stress on either patient or dentist.

The behavioural modification techniques used are those normally employed in practising dentistry for children. One still has to psychologically manage children who are reluctant and it is found that they agree to treatment more quickly under sedation. Restraint during administration of anaesthetic may have to be used occasionally. However, they do not struggle as much or as hard while under sedation. Very occasionally, the HOME (hand over mouth exercise[2]) has to be resorted to, and most of the time the operative procedures are completed in an atmosphere of quiet and calm.

Of those children who did show a response to pain, the reaction was a short "ouch" or small cry, which was quickly forgotten. Amnesia seems to be one of the features of this drug combination, as there is little recollection of operative procedures. To date, the author and his associates have given in excess of 10,000 doses of this drug combination with a small number of adverse reactions as mentioned previously. None of the adverse reactions was serious enough to require medical attention.

Pharmacology – The combination of drugs used in this study are hydroxyzine (Atarax) and methotrimeprazine (MTM) (Nozinan).

Hydroxyzine HC1 (Atarax) – This drug is a minor tranquilizer of the diphenylmethane group. It has antihistaminic, anti-anxiety and anti-emetic properties.

Metrotrimeprazine (Nozinan) – This is a major tranquilizer of the phenothiazine group. It is a sedative with marked analgesic effect[3,4] comparable to meperidine (Demerol+) or morphine.

+ *Winthrop Laboratories*

So that one can put these drugs into perspective with what has been commonly used in dentistry in the past, the following chart may be useful (**Fig. 2**). All combinations of the minor tranquilizers with the narcotics and synthetic narcotics[5-9] have been tried, and in the author's opinion, the hydroxyzine (Atarax) and methotrimeprazine (Nozinan) combination has proved to be the most effective in his practice.

MEDICAL and PHARMACEUTICAL RESEARCH

Many studies have been done on MTM, and the following have been selected to show:

1. Analgesic effect:

(a) A 325 per cent increase in voltage was required to stimulate the tooth pulp and an 88 per cent increase in voltage was required to stimulate the sciatic nerve, as compared to the controls.[10]

(b) MTM is as effective in controlling pain as meperidine (Demerol) but 50 per cent as effective as morphine.[11,12]

2. The effect on heart and respiratory function is shown in **Table II**.

3. Anti-emetic properties – in patients undergoing cancer chemotherapy, the frequency of nausea and vomiting was reduced during use of MTM when compared to other anti-emetic drugs.[14]

4. The use of MTM as a pre-surgical drug – the results of a double-blind study showed MTM to be as effective as morphine or meperidine (Demerol) used as a pre-surgical drug.[15]

5. Effectiveness as a postoperative analgesic – MTM was found to be as effective as meperidine[12] in controlling pain after surgery.

6. The toxicology of MTM[16] – the lethal dose 50 in mice is: 70 mg/kg – intravenous; 300 mg/kg – subcutaneous; and 375 mg/kg – oral.

DOSAGE and METHOD of ADMINISTRATION

The following elixir of hydroxyzine (Atarax) and MTM (Nozinan) should be given 2-2½ hours before operation, with a glass of chocolate milk or plain milk with 2 tsp. of sugar added.

1 drop of Nozinan oral drops = 1 mg of MTM

10 c.c. of Atarax is given to all ages

The number of MTM (Nozinan) drops added to 10 c.c. of hydroxyzine (Atarax) varies according to age as follows: 2 years, 4-5 drops; 3 years, 5-6 drops; 3-6 years, 6-7 drops; and over 6 years, 7-8 drops – depending on size and degree of anxiety.

The availability of methotrime prazine, by country, is shown in **Table III**.

CONTRAINDICATIONS and SIDE EFFECTS

- patients with blood dyscrasias
- patients with hepatic problems
- sensitivity to phenothiazines
- local anaesthetic with high epinephrine content (1:200,000 epinephrine is not too high)
- postural hypotension if given alone
- nausea, vomiting and syncope if given on an empty stomach.

DISCUSSION

The search for the ideal drug to control the behaviour of children in the dental operatory situation has extended over many years. Much of the research has involved injectable drug forms and elixir combinations, but none has performed as expected over the long term,[1] and the average practitioner could not use the various combinations suggested without a considerable change in operative techniques. The ideal drug or combination of drugs would be one which could be given by the mothers at home, with the result that the patient would be able to walk into the office, be easily controlled while the operative procedures were performed and leave as an ambulatory patient. The combination of hydroxyzine (Atarax) plus a phenothiazine called methotrimeprazine (Nozinan) seems to fulfill these criteria.

The U.S.A. equivalent of MTM is available in injectable form only, and therefore the oral form has not been available for experimentation in that country. In Canada, England, France and Germany, this drug is available for oral administration, and can be combined with hydroxyzine (Atarax) to form an elixir which can be given at home, two hours before the child arrives for a dental operation.

CONCLUSION

More than 10,000 patients in a paedodontic group practice in Vancouver, B.C. were premedicated with a combination of Atarax and Nozinan. Without exception, each patient who took the drug as prescribed had a positive reaction, with results ranging from 50 per cent to 95 per cent effective. The criterion upon which the success was based was a scale from 1 to 10 (the 50 per cent level being "crying", which was easily controlled). The majority of patients were in the 70 per cent to 90 per cent effective level, where there was a pain response but no crying or resistance. Those in the 90 per cent to 100 per cent effective level had operative procedures performed without anaesthesia.

This elixir seems to be an excellent drug combination which can easily be introduced into the average general practitioner's office with confidence in its effectiveness and safety.

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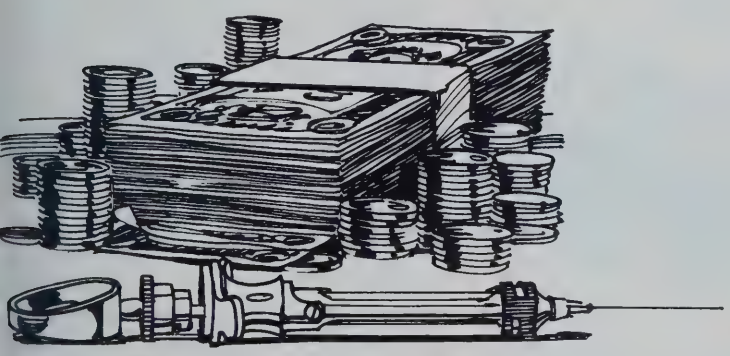

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ORAL COMPLICATIONS OF CANCER CHEMOTHERAPY

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ABSTRACT

The prognosis of patients with widespread malignancies continues to improve due to recent advances in chemotherapy. Such therapies, however, are associated with both short- and long-term complications involving the oral cavity as well as other regions of the body. Until such oral complications are subjected to systematic investigation, their treatment will remain symptomatic and empiric. In view of the increasing numbers of patients being subjected to such therapies, dentists should be aware of the oral complications that may be encountered, either on an in-patient or out-patient basis.

SOMMAIRE

Grâce aux progrès de la chimiothérapie, le pronostic des patients qui souffrent de maladies malignes générales continue de s'améliorer. Cependant, ces thérapies sont utilisées lorsque surviennent des complications à court ou à long terme dans la cavité buccale ou d'autres parties du corps. Le traitement des complications buccales restera symptomatique et empirique tant et aussi longtemps qu'on ne procédera pas à des examens systématiques. Vu le nombre croissant des patients qui sont soumis à la chimiothérapie, les dentistes doivent être au courant des complications qui peuvent survenir tant chez les patients externes que chez les patients internes.

The prognosis of patients with disseminated malignancies (the leukemias, lymphomas and small cell lung disease) has been greatly improved by recent advances in chemotherapy.[1] Such patients may therefore attend a general practitioner for routine dental care during the remission phase of their disease. Alternatively, dental practitioners may be requested to provide advice and/or treatment for the patient's oral complications during chemotherapy. It is therefore imperative that dental practitioners are conversant with the probable complications that may arise from such aggressive chemotherapeutic regimens.

Chemotherapy serves to prolong life with the achievement of remission. For instance, acute myelogenous leukemia (AML), if untreated, is rapidly fatal due to infection and/or hemorrhage, with a median survival of less than two months. Remission rates of 76 per cent have been reported for AML patients after high dose induction regimens of daunorubicin, cytarabine and thioguanine,[2] with analogous claims for other therapeutic regimens. Such regimens, however, employ agents with low therapeutic indices,[3] and multi-system toxicities frequently result.[4-6] These include short-term complications such as acute allergic reactions and stomatitis and long-term complications such as bone marrow toxicity and cariogenesis.[7-10] An example of cariogenesis has been described in 216 patients treated for Hodgkin's disease, who subsequently developed AML.[11]

The prevalence and severity of oral chemotherapeutic complications tend to be variable, suggestive of a probable multifactorial etiology, although until subjected to systematic study, their therapy will remain empiric and symptomatic.[12] Approximately 19 per cent of all cancer patients receive chemotherapy and of these, approximately 40 per cent develop acute oral complications,[13] often with recurrent esophagitis and other gastrointestinal complications.[14,15] In a study of 43 children undergoing chemotherapy for mainly hematological malignancies, 93 per cent had acute oral complications which included ulcers (71 per cent), lip cracking (38 per cent), xerostomia (11 per cent) and mucositis (9 per cent).[16] Although some chemotherapeutic agents (e.g., methotrexate) are associated with a high incidence of acute oral complications,[17] these complications do not develop in other patients receiving analogous regimens. A preliminary retrospective study of 70 adult AML patients by the present authors has shown that, while 70 per cent developed oral lesions, 30 per cent did not, despite receiving analogous therapies. Even in patients who developed oral lesions, analogous complications were not associated with each therapeutic schedule.

TABLE I

Chemotherapeutic agents associated with oral lesions (mucositis)

Methotrexate[18,19]
5-Fluorouracil[20,21]
Adriamycin[22,23]
Mitomycin C[24]
Actinomycin D[24]
Bleomycin[25]
Pyrazofurin[26]
N-(phosphonacetyl)-L-aspartate[27]
Triazinate (NSC 139105)[28]
4'-(9-acridinylamino)methanusulfan-m-anisidide[29]
Dianhydrogalactitol[30]
5-Fluoro-2'-deoxyuridine[31]
cis-dichlorodiammine platinum (II)[32]
Vincristine[33]
Daunomycin[34]
Ara-C[35]

CHEMOTHERAPEUTIC REGIMENS

Numerous chemotherapeutic agents (**Table I**) have been associated with oral complications. The contributing factors include the type and dosage, patient age and sex, diagnosis and degree of metastasis, previous therapeutic regimens and other

medications, degree of associated cachexia and anorexia, level of self-care capability and breathing habits, dental health status, degree of myelosuppression and the inhibition of renewing populations. Myelosuppression and inhibition of mucosal renewal appear to be the predominant factors contributing to oral complications.

COMPLICATIONS

Infection

In patients with leukemia,[36] non-Hodgkin's lymphoma[37] and multiple myeloma,[38,39] the proximate cause of death is infection associated with impaired antibody response, diminished immunoglobulin levels[40] and neutropenia due to bone marrow infiltration and/or chemotherapy along with deficient phagocytosis, opsonization and intracellular lysozymes.[41] Most infections develop from organisms colonizing the alimentary and upper respiratory passages (especially *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Candida albicans*), leading to oral and gastrointestinal infections.[42] Approximately 50 per cent of these infections are therefore of endogenous origin, the remainder being derived from organisms acquired from the hospital environment during therapy.[43] Unfortunately the latter organisms tend to be more virulent and resistant to commonly used systemic antimicrobials.

An important contributory factor is the nature of the underlying malignancy,[44] since tumours provide an ideal environment for infection on undergoing necrosis.[37] Fewer infections (41 per cent) appear to develop in patients with mixed lymphocytic-histocytic lymphomas than poorly differentiated lymphomas (63 per cent), although in a study of 133 infections in 125 patients with late stage non-Hodgkin's lymphoma, chemotherapy-associated granulocytopenia appeared to be the predominant factor in 51 per cent of infections.[45]

The increased prevalence of infections in granulocytopenic patients has been clearly demonstrated,[46] and infections in a granulocytopenic setting are common now that myelosuppressive agents are increasingly used in neoplastic therapy.[47] In patients with acute leukemia, about 50 per cent of major organ and 70 per cent of disseminated infections are associated with neutropenia.[48] This is a common chemotherapeutic complication, although if the neutrophil count remains above 2000/mm^3, the frequency of infection is less (2 per cent) than with the count below 100/mm^3 (28 per cent).[49] The degree of myelosuppression depends on the chemotherapeutic regimen; phase-specific agents produce rapidly reversible granulocytopenia, cycle-specific an intermediate pattern and non-cycle-specific agents the most protracted suppression.[50] The physical signs and symptoms of inflammation are less prevalent with myelosuppression than matched controls,[51] so that infections may pass unnoticed until autopsy.

Patients with disseminated malignancies yet adequate circulating neutrophil levels may also be susceptible to infections, due to impaired neutrophil function secondary to the disease or therapy.[33,52,53] Impaired antibody production has been noted in patients with chronic lymphocytic leukemia, lymphocytic lymphoma,[54] and Hodgkin's disease,[55] whereas therapeutic agents may depress cell-mediated cytotoxicity.[56] The association between infection and lymphopenia is not so marked as with neutropenia in patients with acute leukemia who receive chemotherapy,[48] although lymphopenia is generally associated with neutropenia. The inclusion of adrenal corticosteroids in therapeutic regimens may also inhibit inflammatory responses.[57]

Dental Infections

Approximately 28 per cent of acute oral complications during induction chemotherapy of acute non-lymphocytic leukemia (ANLL) patients result from exacerbation of pre-existing periodontal disease[58] although, as with other infections,[51] the associated inflammatory signs tend to be subdued. High levels of immunosuppressive therapy (e.g., prednisone) for renal allograft patients also appear to be associated with reduced gingival inflammation regardless of plaque level,[59,60] Conceivably, undiagnosed periodontal infection may account for some of the fevers of unknown origin in such patients as with other hematological malignancies.[61] Intensive oral hygiene measures before and during myelosuppressive therapy have been shown to reduce acute periodontal infections in ANLL patients[62] although such measures did not eliminate all acute periodontal infections, especially in patients with leukemic gingival infiltrates.[63] Generalized gingival enlargement has been reported in 36 per cent of acute, and 10 per cent of chronic leukemic patients.[64]

Periodontal exacerbation reflects complex plaque and host response interactions.[65] Although shifts to predominantly enteric gram-negative bacteria have been reported in the oral flora of acute leukemic patients,[66] data from 20 ANLL patients receiving chemotherapy indicated quantitative rather than qualitative oral flora shifts during acute periodontal exacerbations.[63] Qualitative rather than quantitative shifts in the major pathogens are generally associated with mortality in ANLL.[67] Patients with depressed neutrophil function, e.g. cyclic neutropenia[68] drug-induced agranulocytosis[69] the Chediak-Higashi syndrome[70] 'lazy' leukocyte syndrome[71] and diabetes[72] also exhibit severe periodontal complications as well as mucosal ulceration. Moreover, even when patients receive systemic antibiotics along with their chemotherapeutic regimen, acute periodontal exacerbation may still occur – a problem that demands further study.

Fungal, especially candidial (*Candida spp*) infections, also occur in such compromised patients' oral cavities.[48] The incidence of oropharyngeal candidiasis is approximately 5 per cent in cancer patients, the prevalence tending to increase when oral mucositis complicates chemotherapy.[49] The prevalence of oral carriers of *C. albicans* in healthy adult patients is 44 per cent[73] although no specific percentage of *Candida spp* contrasts have been detected between controls and patients receiving chemotherapy.[74] Unfortunately, in patients receiving chemotherapy, candidial infections may be resistent to antifungal therapy, e.g. nystatin.[75,76] For instance, in 70 acute leukemic patients undergoing chemotherapy, 62 per cent who received prophylactic nystatin and 58 per cent who did not, developed oropharyngeal candidiasis; the fungal infections tended to be most severe in granulocytopenic patients with chemotherapy-associated mucositis.[76] Recent reports, however, claim empiric amphotericin[77] or nystatin combined with other antibiotics[78] are effective antifungal measures in such patients, although their routine use has yet to receive universal support.

Cancer patients are also susceptible to acute viral infections prevalent in the community, particularly the herpes virus group. For instance, *Herpes zoster* occurs in 3 to 15 per cent of patients with malignant lymphoma, myeloma and lymphocytic lymphoma,[79] but in only 0.2 to 2.0 per cent of the general adult population. Although such infections probably represent reactivation of latent infections, reinfection may also occur, as suggested by occasional epidemics among cancer patients.[80]

In cancer patients, *Herpes simplex* (HSV-1) infections most often occur on the lips, oral cavity and nose, although the occasional coalescence of multiple lesions coupled with *Staphylococcus aureus* or gram-negative bacilli[49] may complicate their diagnosis. HSV-1 infections are associated with chronic and painful oral ulceration, particularly in immunosuppressed (e.g., transplant) patients.[81,82] Only patients with antibody to HSV-1 are subject to recurrent cold sores[83] and reactive to HSV-1 following transplantation.[82] In a

recent study, HSV-1 was more frequently recovered from asymptomatic outpatients received cytotoxic therapy than from those with or without malignancy who were not receiving such therapy.[84] Nevertheless, the percentage of patients in whom HSV-1 was isolated did not differ significantly from that of healthy hospital personnel, and no particular malignancy or chemotherapeutic regimen was associated with active HSV-1 infection. Thus, although HSV-1 is significantly associated with symptomatic stomatitis in chemotherapy patients, it does not account for all the mucosal lesions in sick patients.

Although the etiology of aphthous stomatitis remains controversial, the major etiologic factors appear to be altered immune responses to non-pathogenic oral flora and host oral tissues.[85,86] A variety of precipitating factors have also been identified, including trauma[87] and nutritional deficiencies.[88] Although there are no reports on the prevalence of such lesions in cancer patients, particularly associated with chemotherapy, aphthous ulceration is a component of other disease processes, e.g., leukopenia.[89]

Chronic dental pulp infections have also been suggested as a significant source of infection during periods of myelosuppression. In one study, 5-10 per cent of cancer patients demonstrated roentgenographic evidence of pulpal infection of sufficient magnitude to cause bony involvement[63] whereas in another, 71 percent of 21 patients with stage III testicular carcinoma showed clinically significant dental (periapical) lesions.[91] Apart from one tentative study,[92] the correlation between dental infections and exacerbation of chronic inflammatory lesions in cancer patients, particularly associated with chemotherapy, has yet to be investigated.

Odontogenic symptoms may also reflect chemotherapy-associated emesis – another distressing feature of therapy for disseminated malignancies.[93] Interestingly, one study has reported no changes in salivary flow rate, pH or protein content in patients undergoing chemotherapy[94] although clinically such patients frequently complain of xerostomia.

Mucositis

Mucositis (a term used to signify inflammation and/or ulceration of the oral mucosa) may reflect non-specific chemotherapeutic depression of cellular proliferation. The average 5-7 day oral mucosal turnover time appears to correspond to the delay before clinical ulceration, but although buccal mucosal desquamation may precede mucosal ulceration[94,95] the direct drug toxicity without antecedent atrophy has also been described.[94,96] Oral mucositis generally begins three to four days after chemotherapy, and healing may be uneventful unless complicated by secondary infection.[97] These lesions may be severe and associated with pharyngitis and esophagitis in patients receiving concurrent or previous irradiation.[98]

As in the remainder of the gastrointestinal tract, the oral mucosal complications of chemotherapeutic regimens are generally dose-related,[99] although there is marked variation, depending on the therapeutic schedule and regimen. Chemotherapeutic-associated mucositis tends to be non-agent specific, although some agents are more frequently implicated than others, e.g., methotrexate, adriamycin.

In addition to nausea, other chemotherapeutic oral complications include burning sensations with mildly acidic foods. Neoplastic-associated cachexia and anorexia may also lead to nutritional deficiencies[100] – features that tend to be exacerbated by chemotherapy.[6] The chemotherapeutic complications of nausea and vomiting may also impair nutrition and be associated with depression of oral mucosal renewal and local host defensive mechanisms.[101] Thus, oral ulceration and inflammation in patients with disseminated malignancies may exhibit a multifactorial etiology.[102] Varying degrees of anemia associated with disseminated, especially hematologic, malignancies and/or therapy may also predispose to mucosal atrophy, as in pernicious[103] and iron deficiency anemias.[104]

Oral bleeding is another relatively common consequence of chemotherapy with platelet counts below 15000/ul. It is generally more prevalent and severe in patients with poor oral hygiene and those with preexisting periodontal disease. Hematoma formation resulting from trauma is often exaggerated with platelet counts below 50,000/ul, with secondary infection tending to occur with myelosuppression. Another study has shown that distressing hemorrhagic lesions often occur in patients with marrow transplants for aplastic anemia,[105] although such oral manifestations have yet to receive systematic study.

CONCLUSION

The oral complications of modern aggressive chemotherapy reflect a multifactorial etiology, with myelosuppression and depression of epithelial renewal being the predominant factors. Such oral complications as exacerbation of existing periodontal, periapical and pulpal inflammatory lesions can obviously be reduced by prior regular dental therapy, whereas therapy for acute oral ulcerations, until subjected to investigation with matched controls, will remain empiric and symptomatic. For instance, in some patients chemotherapy-associated candidiasis is resistant to antifungal prophylaxis. In addition, even some patients with apparently healthy mouths exhibit severe periodontal destruction after chemotherapy. Only by embarking upon such investigations will the well-being of these generally distressed patients be improved.

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VIOLATION OF SURGICAL PRINCIPLES IN PERIODONTAL FLAP SURGERY—ITS CONSEQUENCES

Vijay K. Pruthi, BDS
San Antonio, Texas

Fig. 1A. *Flap under tension because incision was not extended far enough.*

Fig. 1B. *Surgical site seen in Figure 1A. One week postsurgically, the traumatized flap is sloughed and healing very slowly.*

ABSTRACT

Basic surgical principles are of critica importance for flap survival following peri odontal surgery. These principles includ aseptic technique, sharp dissection, gentl flap manipulation, an adequate base fo blood supply, thorough irrigation, use o fine suture material, lack of tension, an obliteration of dead spaces.[1,2]

The purpose of this article is to identif clinically unacceptable post-surgical result because of violation of basic surgico principles.

SOMMAIRE

Les principes élémentaires de la chirur gie revêtent une importance critique quan il s'agit de sauver un lambeau gingival à l suite d'une opération parodontaire. Ces prin cipes ont trait à l'asepsie, au décollement à la manipulation, à l'alimentation san guine, à l'irrigation, au matériel de suture à l'élimination de la tension et à l'oblitéra tion des espaces morts.[1,2]

Dans cet article, on passe en revue le résultats postopératoires qui sont médicale ment inacceptables parce que les principe élémentaires de la chirurgie n'ont pas ét observés.

INCISIONS

During surgery, all incision should be made definitely an without equivocation; once th initial incision is made, the results of th operative procedures are irrevocable. Timi and tentative incisions make for "hash ing".[3] Incisions can be made as sulcular o internal bevels, depending upon the amoun and type of tissue present and the fina planned positioning of the flap. A precis incision 2 mm beyond the actual surgica site, mesially or distally or both, facilitate an adequate reflection of the flap. An in adequate reflection results in trauma t the flap, with delayed and painful healin (**Figs. 1A** and **1B**).

Frequently, vertical incisions are re quired to facilitate flap mobility and access and to avoid possible fenestrations an dehiscences often encountered on promi nent cuspids or other teeth in buccover sion[4] (**Fig. 2**). Whenever necessary

vertical incisions should be made along the ine angle of the tooth and not over promi- ıent roots, thus avoiding irreversible radi- ular bone loss and gingival clefts. Many cli- ıicians prefer a well-designed envelop flap ecause slow healing has been observed vhere vertical incisions were used (**Fig. 3**).

Complications may arise when vertical ncisions are extended into the mucosa in he mandibular lingual region. A vertical ncision in this area has the potential for acilitating infection within the sublingual, ubmandibular and lateral pharyngeal ana- omical spaces. Vertical incisions can also ause unnecessary hemorrhage in the man- ibular second molar area due to the in- reased vascularity in that region. In addi- ion, a vertical incision on the palate may ever a palatal artery if the incision is too eep and distal to first bicuspid.[5-7]

It is quite acceptable to remove 1-2 mm f marginal gingiva while making the inci- ion when an adequate band of keratinized ingiva exists (**Fig. 4**). Nevertheless, it is elpful to remember that gingiva is precious, nd every effort should be made not to estroy it.[8] A sulcular incision is more pru- ent where a narrow zone of gingiva exists; onsequently, internal thinning should be one to remove the diseased sulcular epi- helium and retain most of the mature soft issue complex. Every effort should be made o avoid perforating the base of the flap. If he flap is perforated, the blood supply is ompromised, irreversible radicular bone oss can take place, and the flap can slough. Gentle flap manipulation is indispensible in rder to prevent flap trauma and probable lough with consequent painful, slow ealing.

PALATAL FLAPS

Various approaches to palatal flap sur- gery have been reported — such as the ledge nd wedge, linear and scalloped inci- ions.[9,10] When the flap is short and the one remains exposed, it may resorb, ecrose and sequestrate. Although the heal- ng will be delayed and painful,[11] nature an tolerate the poor surgical technique of n operator and produce acceptable results, ecause palatal bone is thick and contains nough cancellous core needed to repair. If he flap is too long, it may create a residual oft issue pocket and the osseous recontour- ng will have little benefit. Therefore, it is ighly recommended to design the flap and dapt it so that the bone and flap have a armonious relationship. An excessive hinning of the flap, overzealous infiltration vith epinephrine and excessive tension xerted on the flap can very well lead to nsatisfactory postoperative results[9,12] (**Fig. 5**). On the other hand, inadequate nternal thinning of papillary and marginal ingiva results in lumpy looking gingiva

Fig. 2. *Flap demonstrating vertical incision at the disto-buccal line angle of prominent cuspid. Thus flap is adequately reflected and relaxed.*

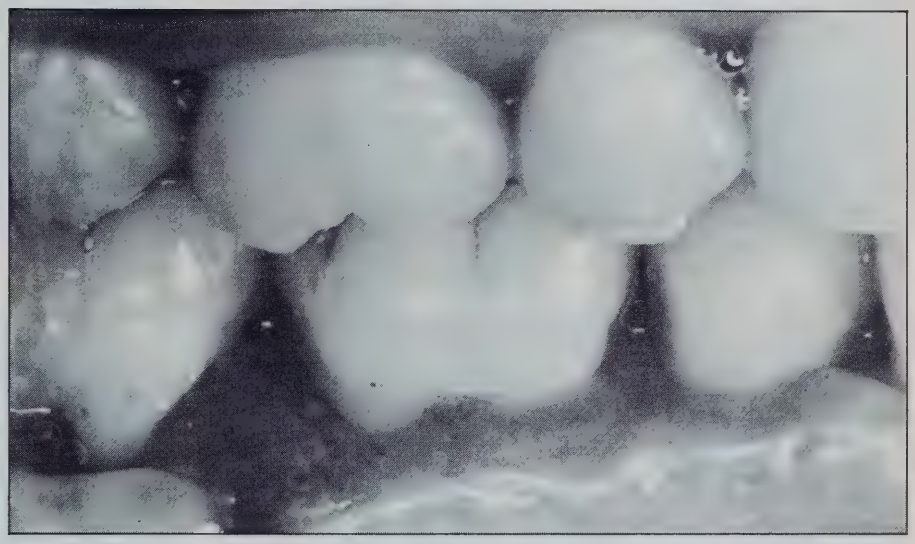

Fig. 3. *Example of delayed healing along the line angle of vertical incision between mandibular first and second molars. One week postoperative.*

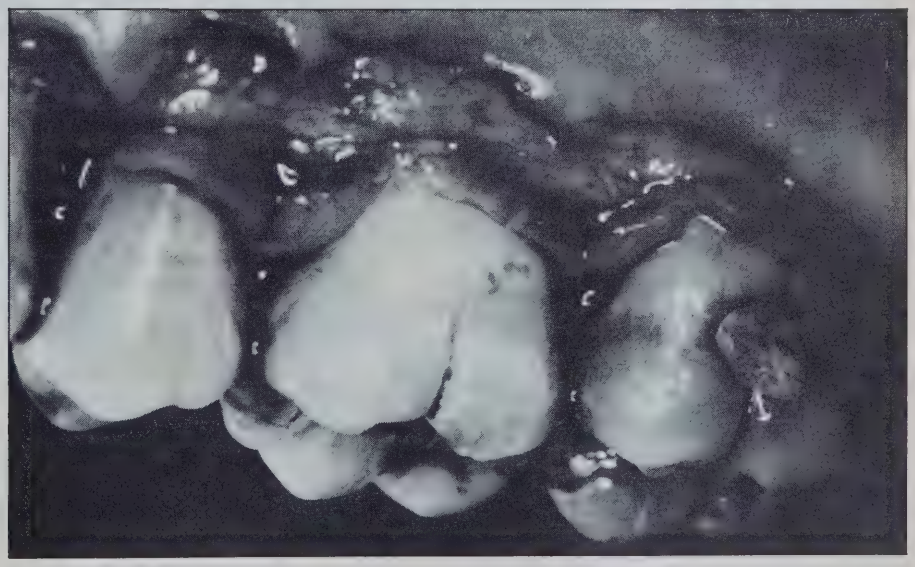

Fig. 4. *Incision displaying removal of a couple of millimeters of gingiva because adequate band of keratinized gingiva exists.*

Fig. 5. *Excessive thinning of flap (two weeks postoperatively), part of the flap has been lost, resulting in denudation of bone, slow and painful healing.*

Fig. 6. *Bulbous papillae (four weeks postoperatively) in need of gingivoplasty to create more physiologic contour.*

Fig. 7A. *Surgical site displaying osseous recontouring.*

Fig. 7B. *Area shown in Figure 7A after osseous recontouring. Fla placed and sutured too far coronally. Pocket depths will not be eliminated.*

postsurgically. Consequently, a "touch up" gingivoplasty is often required to establish a more physiologic contour[13] (**Fig. 6**).

RETROMOLAR AREA

Dealing with the retromolar area is not only a tedious job but also a frustrating experience for the therapist, because the tissue piles up postsurgically.[14] Invariably, lack of keratinized gingiva exists in the retromolar region and many clinicians prefer to leave denuded bone to negate the piling up of tissue postsurgically. Consequently, a tight gingiva with minimal sulcus depth does result at the expense of the patient's discomfort, delayed healing, and resorption of the bone.[11] Ideally, the bone should be protected and covered with mature tissue, avoiding the painful and delayed postsurgical results. However, for good end results, leaving the bare bone in the retromolar area seems to be the right avenue to choose.

SUTURING

When suturing, vertical incision areas should be closed first to avoid flap displacement. Care should be taken not to exert tension on the flap. If flaps are sutured too far coronally in pocket elimination procedures, soft tissue pockets will re-establish and will nullify all the benefits previously gained[8] (**Figs. 7A** and **7B**). On the other hand, regeneration and reattachment attempts require very precise flap placement in order to achieve adequate "closure".[15]

SUMMARY

Postsurgical abused and traumatically appearing flaps can be avoided if sound surgical principles are scrupulously followed during periodontal surgery. Proper flap design, firm incision, adequate reflection, gentle flap manipulation and meticulous postoperative follow-ups are the key steps which result in successful periodontal flap surgery.

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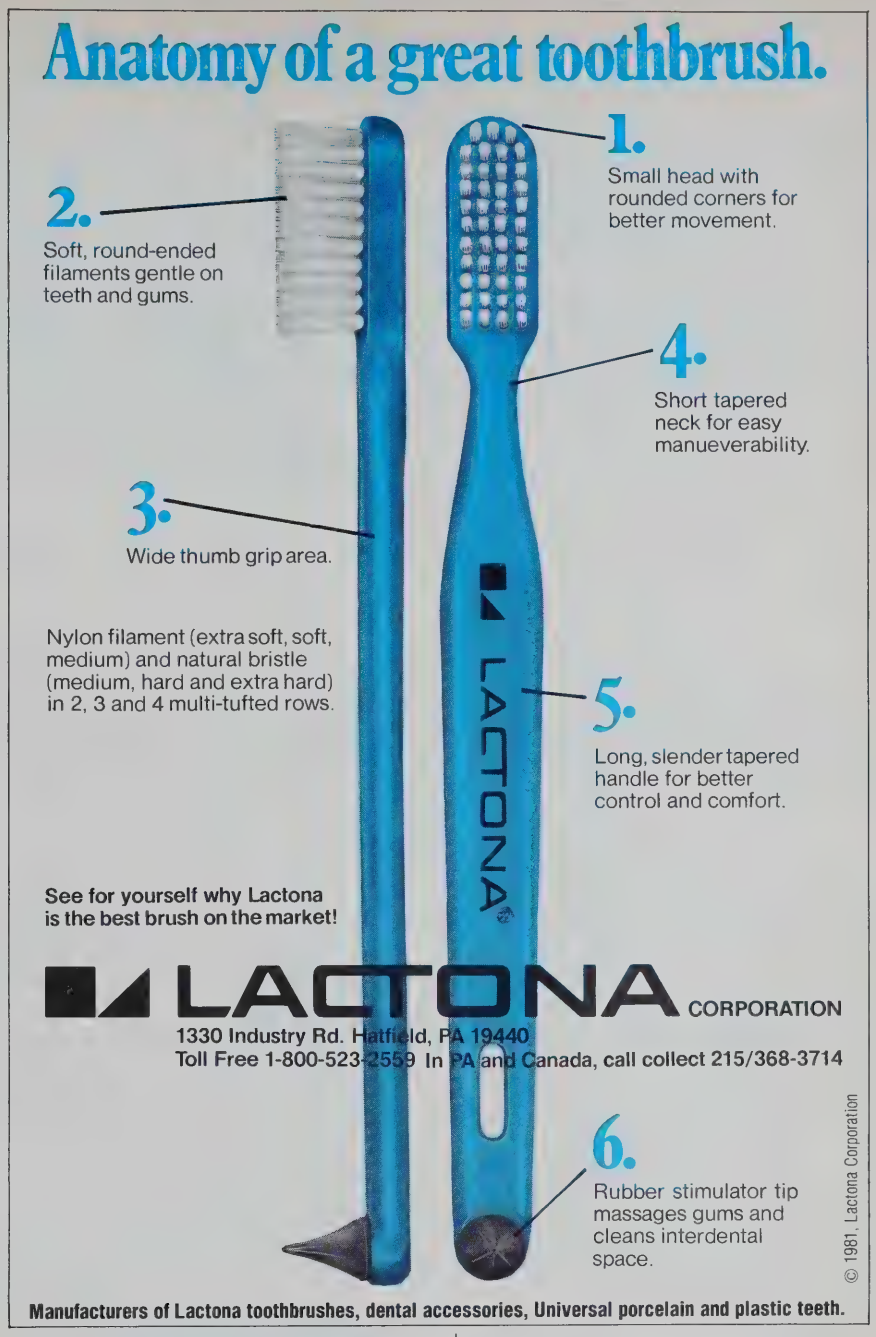

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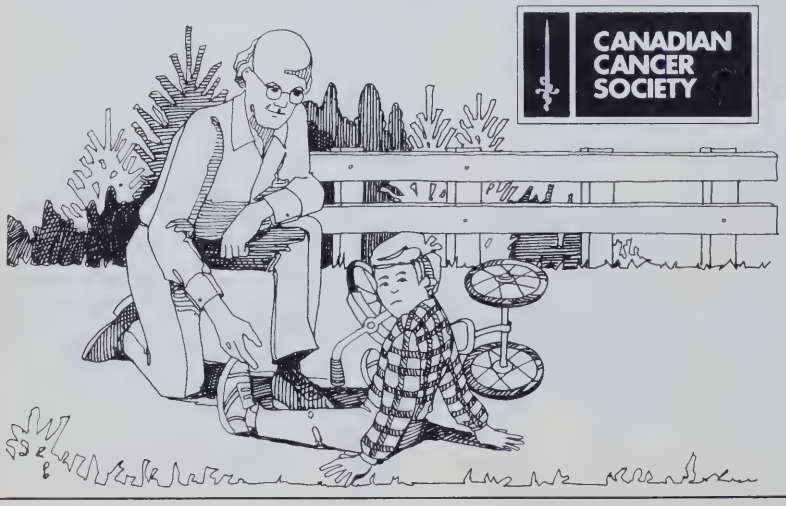

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MAUVAISE UTILISATION DE L'ÉLECTROCHIRURGIE : CORRECTION PAR GREFFE PÉDICULÉE

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École de Médecine Dentaire,
Université Laval, Québec

ABSTRACT

The use of electrosurgery in dental prac-ice has definite advantages but occasionally ome complications will arise. The purpose f this clinical report is to present a severe um-recession case following a bad use of lectrosurgery for a fixed partial denture mpression-taking. The procedure suggested s the pedunculated graft; it is described long with the results achieved.

RÉSUMÉ

L'emploi de l'électrochirurgie en cabinet dentaire apporte des avantages certains mais à l'occasion des complications peuvent survenir. Ce rapport clinique présente un cas de récession gingivale sévère suite à la mau-vaise utilisation de l'électrochirurgie lors de la prise d'empreinte en prothèse partielle fixe. La greffe pédiculée est suggérée comme mode de traitement. La procédure est décrite de même que les résultats obtenus.

NTRODUCTION

L'emploi de l'électrochirurgie en dentisterie et surtout en dentis-terie de restauration est devenu nonnaie courante dans les cabinets den-aires. Le dentiste y retrouve de nombreux vantages mais l'on doit se rappeler que on utilisation demande une connaissance igoureuse de l'anatomie du périodonte, de même que de l'appareil utilisé.

L'électrochirurgie (1) est l'application ux tissus vivants de l'énergie sous forme e radiation qui produit une chaleur engen-rée par l'électricité, dans le but de les altérer ou de les détruire pour des fins thérapeu-tiques. Avec le raffinement technologique de l'équipement et l'amélioration de la méthodologie, l'électrochirurgie est deve-nue plus précise et ses effets mieux con-trôlés. Cependant, la plupart des chercheurs semble d'accord pour dire que le potentiel pour causer des dommages au périodonte existe encore, même quand on emploie l'équipement le plus moderne.

Quoique l'électrochirurgie est employée chaque jour avec peu de problèmes de gué-rison rapportés, il est concevable de penser que les complications de ce genre sont plus fréquentes que l'on voudrait le voir.

PRÉSENTATION DU CAS

Une femme de 31 ans se présente dans une clinique dentaire privée pour la fabri-cation d'une couronne complète sur la canine supérieure gauche. Lors de l'examen radiologique, une lésion radio-translucide persistante après un traitement endodon-tique fut découverte et il fut décidé de recom-mencer le traitement de canal. Par la suite, un pivot fut fabriqué et une couronne tem-poraire. Un peu plus tard, la préparation fut complétée et l'empreinte finale prise au caoutchouc avec l'aide de l'électrochirurgie. Huit jours plus tard, la patiente se présente en urgence avec une inflammation marquée du buccal de la canine supérieure gauche. À ce moment, il est décidé de placer un pan-sement chirurgical ne contenant pas d'eu-génol pour protéger la région et voir s'il y aurait amorce de formation de tissu de gra-nulation. Une radiographie de contrôle est prise; aucune perte osseuse proximale n'est notée (**fig. 1**). Une semaine plus tard, la patiente est revue et référée au périodontiste vu que l'on ne note aucune amélioration de la condition péridentaire. À l'examen cli-nique, celui-ci note une perte complète de tissu kératinisé (**fig. 2**) au buccal de la canine supérieure gauche laissant un tissu marginal composé d'une muqueuse alvéo-laire inflammée. Le cément est exposé, de même qu'une partie de la plaque buccale; celle-ci a subi une résorption irrégulière et une portion d'os marginal probablement non vital est présente.

Il fut alors décidé d'intervenir immédia-tement par chirurgie. L'emploi du lambeau déplacé horizontalement ou greffe pédicu-lée est la procédure de choix dans ce cas parce que le tissu kératinisé de la latérale supérieure gauche est suffisamment large pour venir couvrir la récession. De plus, la greffe pédiculée est la procédure mucogin-givale la plus effective et esthétique pour le traitement d'une racine dénudée quand un site donneur adjacent de tissu kératinisé est présent (2-3-4).

Procédure

Une anesthésie locale par infiltration avec de la xylocaïne (chlorydrate de lido-caïne) HC1 2 pour cent avec adrénaline 1:50,000 est donnée. On relève un lambeau (5) (**fig. 3-4**) demi-épaisseur (rétention du périoste au site donneur) d'environ une fois et demie la largeur de la lésion. Avant de relever le lambeau, il faut s'assurer que le tissu donneur est suffisamment épais et que l'os sous-jacent ne présente pas de déhis-cence parce que l'on pourrait se retrouver avec une lésion au site donneur similaire à celle que l'on veut corriger. Ici l'incision horizontale a été faite dans la crevasse gin-givale pour nous permettre de conserver toute la largeur de tissu kératinisé; de plus l'on pouvait se permettre d'allonger la

Figure 1: *Radiographie de contrôle prise huit jours après l'emploi de l'électrochirurgie; aucune perte osseuse proximale n'est notée.*

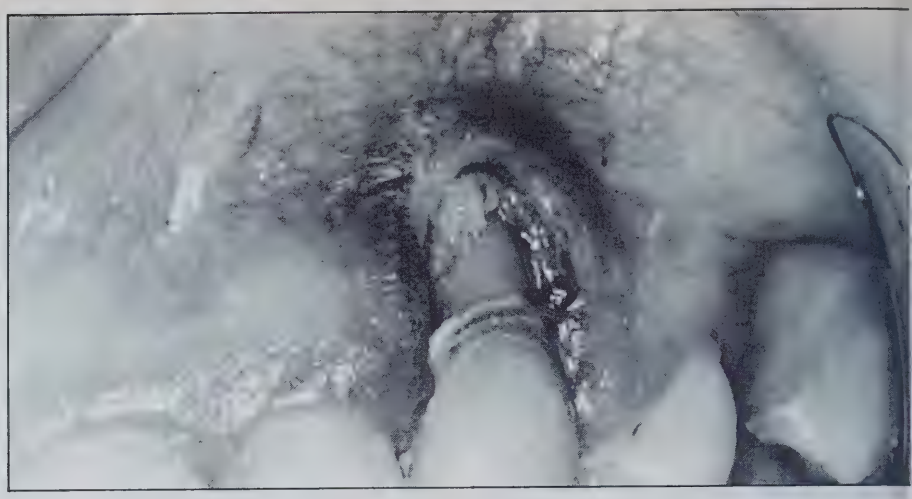


Figure 2: *Photographie de la dent #23 deux semaines après l'emploi de l'électrochirurgie et la prise d'empreinte; il y a perte de tissu kératinisé au buccal de la canine supérieure gauche laissant un tissu marginal composé de muqueuse alvéolaire inflammée. L'os alvéolaire et le cément sont exposés.*

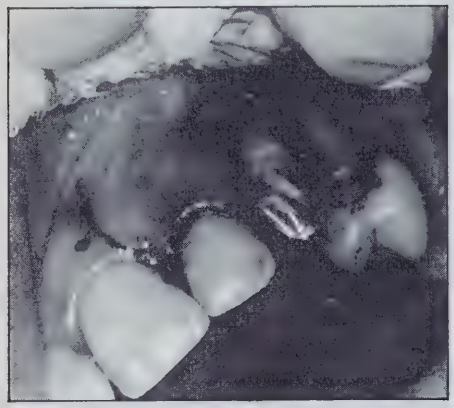


Figure 3: *Préparation du site receveur par une incision en V. Incision horizontale au niveau de la crevasse gingivale de la dent #22 et incision verticale qui délimitera la largeur du lambeau. Au distal de la dent #22, le tissu a été détaché par une incision à biseau interne.*

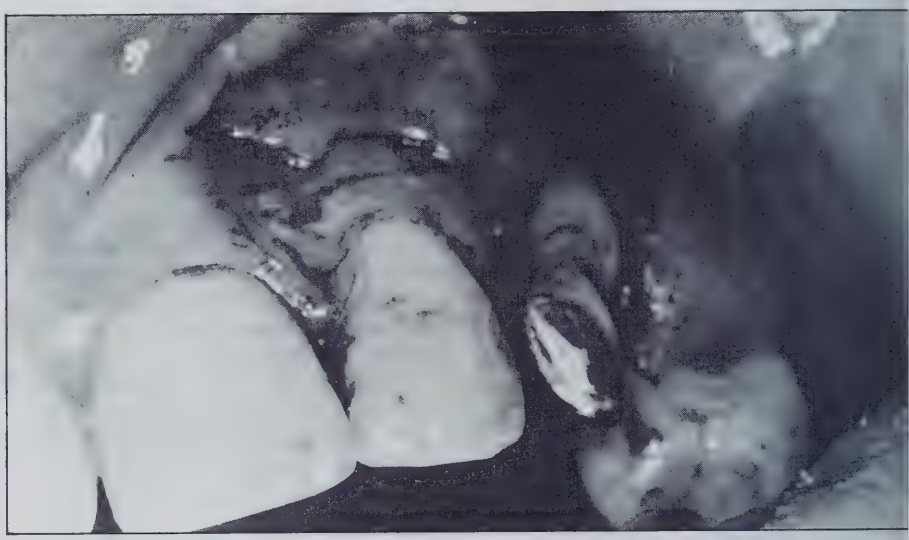


Figure 4: *Lambeau demi-épaisseur (rétention du périoste au site donneur) relevé au buccal de la dent #22.*

Figure 5: *Ablation de l'os alvéolaire marginal exposé et non vital dans le but de recréer un contour osseux physiologique.*

Figure 6: *Photographie après la correction de l'os alvéolaire marginal au buccal de la canine supérieure gauche.*

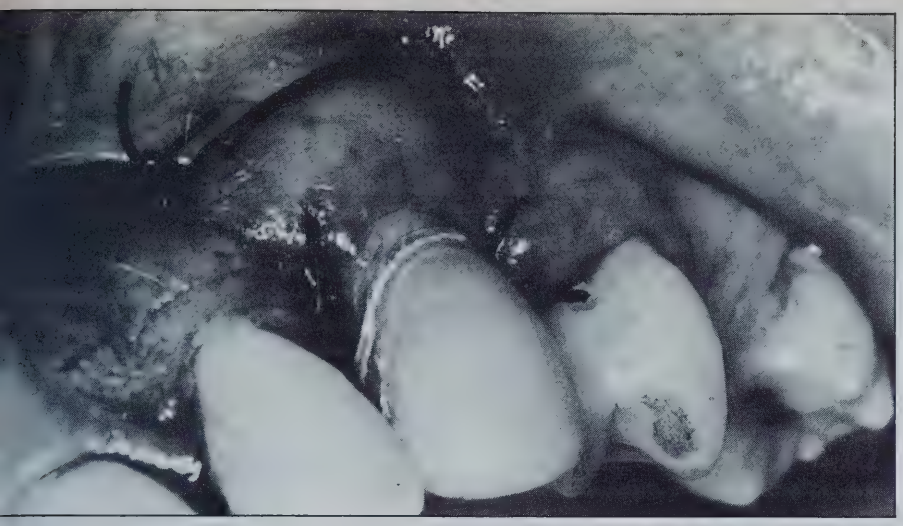


Figure 7: *Déplacement horizontal de la greffe pédiculée pour couvrir l'os et le cément exposés; le lambeau est suturé avec de la soie 4-0. La couronne temporaire est recimentée en place.*

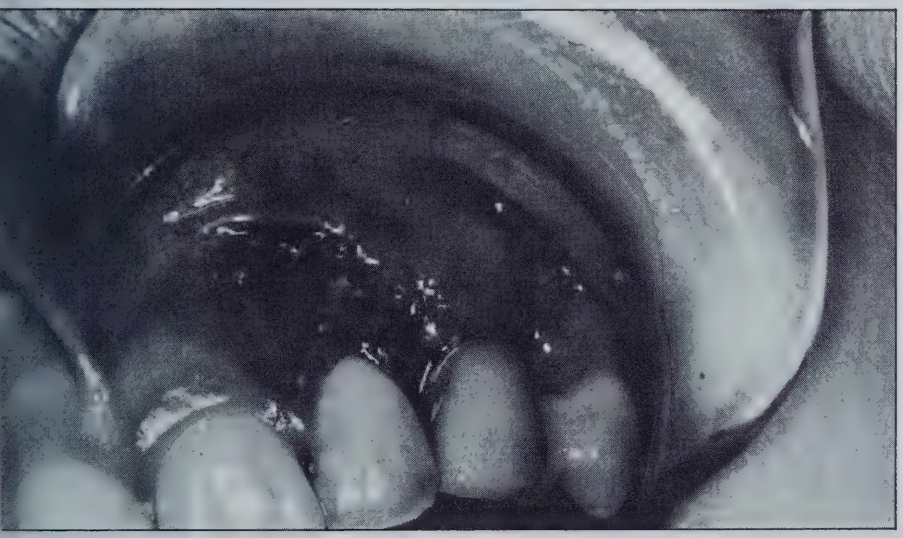


Figure 8: *Photographie lors de l'ablation des sutures une semaine après l'intervention chirurgicale.*

couronne clinique de la latérale supérieure gauche sans compromettre l'esthétique de la patiente.

Au niveau de la lésion, une incision en V est faite dans le but d'éliminer ce tissu enflammé et de préparer le site receveur du pédicule. L'incision correspondant au côté où le pédicule se déplacera est à biseau interne (6). L'autre portion de tissu (côté site receveur – distal dent #23) est éliminée par une incision à biseau externe. Cet arrangement permet de placer du tissu conjonctif contre du tissu conjonctif et d'avoir un tissu qui s'harmonise bien (pas de démarcation). L'os alvéolaire marginal (**fig. 5** et 6) qui était exposé et probablement non vital fut éliminé en essayant de recréer un contour osseux le plus physiologique possible. La portion radiculaire exposée doit être bien aplanie de manière à la rendre lisse et à éliminer tout le cément altéré par le processus inflammatoire. Ceci permet au tissu de granulation qui migre dans la région, d'attacher le lambeau que l'on a déplacé à une nouvelle surface cémentaire. Par la suite, le lambeau est déplacé horizontalement (**fig. 7**) pour venir couvrir l'os alvéolaire et le cément exposés et suturé en place avec de la soie 4-0. Une contre-incision peut être nécessaire à la base du pédicule pour permettre son déplacement et la couverture complète du défaut. Il faut garder la base du pédicule le plus large possible ce qui assure une meilleure irrigation de la greffe pédiculée et par le fait même une meilleure guérison. Une pression doit être appliquée sur le pédicule pour 3 à 5 minutes. Par la suite, un pansement péridentaire est placé sur le site chirurgical. Le pansement et les sutures sont enlevés une semaine plus tard. La région est nettoyée avec du peroxyde d'hydrogène 3 pour cent et dans ce cas n'a pas nécessité de nouveau pansement. La patiente a été instruite de reprendre ses méthodes d'hygiène mais d'éviter la technique de Bass modifiée dans cette région pour au moins six semaines.

Les **figures 8** et **9B** nous montrent la guérison une semaine après et deux mois et demi après la chirurgie. À ce stade, le sondage de la crevasse gingivale démontrait une profondeur de 1 à 2 mm et le tissu gingival au buccal de la dent #23 était immobile. La patiente à ce moment est encore sous temporaire. On doit laisser le temps nécessaire au tissu gingival de guérir avant d'aller compléter la préparation de la pile et avant la prise d'une nouvelle empreinte.

DISCUSSION

Plusieurs études ont été rapportées dans la littérature (7) mais ces études sont ambigües. Certains chercheurs n'ont trouvé aucun problème associé avec la guérison après l'électrochirurgie; d'autres rapportent des changements significatifs lors de la guérison.

Dans le cas présenté ici, on note qu'après quinze jours l'os exposé n'était pas encore couvert par le tissu de granulation (**fig. 2**). D'après Simon & al. (7), le prix à payer péridentairement peut être très élevé si on attend trop longtemps; ceux-ci recommandent d'intervenir chirurgicalement le plus tôt possible et de couvrir l'os exposé avec du tissu gingival sain.

Le choix de la greffe pédiculée est judicieux, puisque celle-ci emmène par son pédicule son alimentation sanguine et n'est pas entièrement dépendante de la diffusion sanguine du périoste sous-jacent au site receveur. C'est peut-être pour cette raison que la greffe pédiculée peut procurer une couverture radiculaire plus prévisible que la greffe libre. Aussi, vu que la greffe pédiculée transporte sa propre alimentation sanguine, elle peut procurer une couverture osseuse si une correction de l'os alvéolaire marginal est nécessaire au site receveur.

CONCLUSION

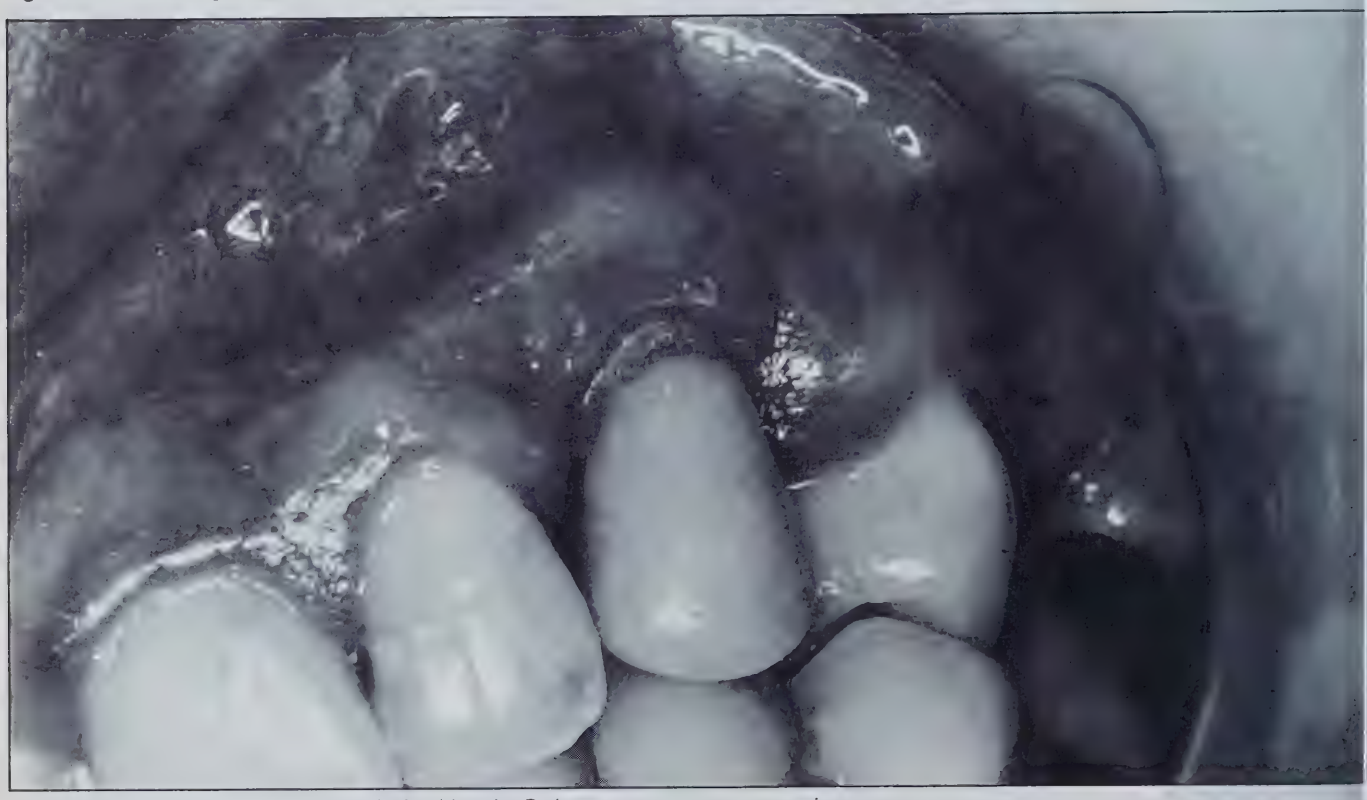
Un cas de récession gingivale a été présenté illustrant les complications qui peuvent survenir suite à la mauvaise utilisation de l'électrochirurgie. Ce cas démontre cliniquement le potentiel pour une destruction péridentaire sévère. L'emploi de la greffe pédiculée nous a permis de créer une bande de gencive attachée kératinisée capable d'assurer une protection adéquate à l'os sous-jacent et nous a permis de couvrir le cément exposé.

***Le Docteur Serge Roy** est Professeur adjoint en périodontie à l'École de Médecine Dentaire, Université Laval, Québec, G1K 7P4.*

RÉFÉRENCES

1. Oringer, M. Electro surgery in dentistry, Philadelphia, *W.B. Saunders Company*, 1962.

Figure 9: *A — Photographie de la lésion avant la correction chirurgicale (idem* ***Fig. 2****).*



B — Guérison deux mois et demi après la chirurgie. Patiente encore sous temporaire.

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7. Simon, B.I., Schuback, P., Dessy, J.M and Kelner, R.M. The destructive Potenti of electro surgery on the periodontiur *J. Periodontol* 47: 342-347, June 1976

Announcements

APRIL/AVRIL

April 24-26: Conference presented by the National Institute of Mental Health and the Office of Medical Applications of Research of the National Institutes of Health (NIH) on "Mood Disorders: Pharmacologic Prevention of Recurrances". Masur Auditorium, The Warren Grant Magnuson Clinical Centre, NIH, Bethesda, Maryland. Contact: Ms. Michelle Dillon, Prospect Associates, 2115 East Jefferson St., Suite 401, Rockville, Maryland, 20852.

April 27-30: Michigan Dental Hygienists Association's 62nd annual meeting, Hotel Ponchartrain, Detroit, Michigan. Contact: The Michigan Dental Hygienists Association, 1609 East Kalamazoo, Suite 11, Lansing, Michigan, 48912 USA. 517-484-1352.

April 28-29: The American Association of Dental Consultants fifth annual spring workshop, Windsor, Ontario, Hilton International. Contact: Dr. Ed Mazak, c/o Green Sheild, 285 Giles Blvd, E., Box 1606, Windsor, Ont., N9A 6W1. 519-255-1133.

MAY/MAI

Le 5-7 mai: La Société Française de Parodontologie will hold VIIIe Journées Françaises Internationales de Parodontologie. Arles, France. Renseignement: Société Française de Parodontologie, 57 rue Amsterdam 75008, Paris, France.

May 6-9: College of Dental Surgeons of B.C. annual meeting, Victoria, B.C. Contact: Myron Faryna, Convention Chairman, 704-1200 Alberni St., Vancouver, B.C., V6E 1A6, 604-681-5226.

May 11-12: Continuing Education Course: Periodontal-prosthodontics with Dr. Ralph Yuodelis, Edmonton, Alberta. Contact: Triple G. Dental Seminars, 11223 76th Avenue, Edmonton, Alberta, T6G 0K2, 403-439-0218 or 403-433-9773.

May 13-16: Ontario Dental Association 17th Annual spring meeting. The Sheraton Centre, Toronto, Ontario. Contact: Mrs. A. M. Durham, 234 St. George St., Toronto, Ont., M5R 2P1, 416-922-3900.

May 15: University of Toronto, Faculty of Dentistry, Class of '54 holding its 30th reunion, Trillium Room, Ontario Place, Toronto, Ontario. Contact: Dr. Wayne H. Tester, 305 Glendale Avenue, St. Catharines, Ontario, L2T 2L6, 416-227-7007 for information.

May 18-20: Port Arthur Collegiate 75th Anniversary reunion, Thunder Bay, Ontario. Contact: Registration Committee, FACI, 401 Red River Rd., Thunder Bay, Ont., P7B 1B4.

JUNE/JUIN

June 3-5: Alberta Dental Association Convention, Banff Alberta, Banff Springs Hotel. Contact: Drs. Wood or Zaharichuk, 3616 54th Ave., S.W., Calgary, Alta., T3E 5H4.

June 4-7: International Association of Oral Pathologists general meeting, Noordwijkerhout, The Netherlands. Contact: Congress Secretariat, 2nd meeting of the International Association of Oral Pathologists, c/o Mrs. R. Mooijen, AZVU, Pathologisch Instituut, De Boelelaan, 1117, MB Amsterdam, The Netherlands.

June 8: Dental Horizons Inc are presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice", Einstein, New York. Contact: Dr. L. Zucker, 3201 Grand Concourse, The Bronx, New York, 10468, 212-933-5510.

June 10-16: XIII Biennial Conference on Dental Research and Education, University of Manitoba, Winnipeg, Manitoba. Contact: The Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man.

June 10-16: The Association of Canadian Faculties of Dentistry is holding its annual meeting, Gull Harbour, Becla Island, Manitoba. Contact: Dr. Lindsay Gibson, University of Manitoba, Faculty of Dentistry, 780 Bannatyne Ave., Winnipeg, Man., R3E 0W3.

June 14-17: 104th Annual Meeting of the British Dental Association in association with the 3rd International Quintessence Symposium and the 2nd International Symposium on ceramics, Barbican Centre, London, England. Contact: The British Dental Association, 64 Wimpole St., London, England, W1M 8AL.

June 19-22: The 6th International Conference on Periodontal Research, Kibbutz Shefaim, Israel. Contact: The Sixth International Conference on Periodontal Research, P.O. Box 394, Tel Aviv, 61003, Israel.

June 21-24: The International Congress of Oral Implantologists World Congress VII for Oral Implantology, Munich, West Germany. Munich Sheraton Hotel. Contact: Clifford J. Kirschner, Executive Director, The International Congress of Oral Implantologists, P.O. Box 2277, Grand Central Station, New York, New York, 10163, 201-783-6300.

June 23-25: Florida Dental Association 1984 Florida Dental Congress. Buena Vista Palace, Lake Buena Vista, Orlando, Florida. Contact: Florida Dental Association, 3021 Swann Ave., Tampa Florida, 33609. 813-877-7597.

June 23-28: Yukon Dental Association presents Summer 84, continuing education seminar and escape. Combines lectures with a hike along the Chilkoot Trail. Contact: Dr. Frances Almstrom, 406 Lambert St., Whitehorse, Yukon, Y1A 1Z7, phone: 403-667-4486.

June 24-27: Canada Safety Council 16th Annual Safety Conference, Skyline and Delta Hotels, Ottawa, Ontario. Contact: The Canada Safety Council, 1765 St. Laurent Blvd., Ottawa, Ont. K1G 3V4, 613-521-6881.

JULY/JUILLET

July 1-6: Ninth Annual Congress of Dietetics, Toronto, Ontario. Hilton Harbour Castle Hotel. Continuing education credits will be assessed for both ADA and CDA registered dieticians. Contact: Congress Canada, Suite 603, 250 University Avenue, Toronto, Ont., 416-591-1498.

AUGUST/AOÛT

August 12-17: The New Zealand Dental Association is holding its biennial conference, Auckland, New Zealand. Contact: Dr. N. P. Ewart, Conference Secretary, P.O. Box 28085, Auckland 5, New Zealand.

August 18-24: Canadian Society of Forensic Science 31st annual conference. Viscount Gort Flag Inn, Winnipeg, Manitoba. Contact: Executive Secretary, 613-235-7112 or write: Canadian Society of Forensic Science, 171 Nepean St., Suite 303, Ottawa, Ontario, K2P 0B4.

August 23-25: New Orleans Dental Association annual dental conference. Contact: Dr. Anthony J. Miranda, General Chairman, 3332 Woodlawn Ave., Metairie, LA., USA 70002. 504-888-5681.

August 25-31: 72nd Annual World Dental Congress of the FDI, Helsinki, Finland. Contact: FDI '84, Helsinki 8, SF 00100, Helsinki, 10, Finland.

SEPTEMBER/SEPTEMBRE

September 4-7: 7th Congress of the International Association of Dentistry for the Handicapped. Amsterdam, Holland. Contact: Mrs. Hongkie Tan, Brouwergracht, 210B, 1013 HD, Amsterdam, Netherlands.

September 9-15: McKay Sub-Branch of the Australian Dental Association will be hosting the North Queensland Dental Convention on Hayman Island. Contact: The Secretary, North Queensland Dental Convention, P.O. Box 838, MacKay, 4740, Australia.

September 14-16: The Canadian Academy of Endodontics twentieth annual meeting. Chateau Lake Louise, Lake Louise, Alberta. Contact: Dr. Carl Hawrish, 762-10830 Jasper Ave., Edmonton, Alta., T5J 2B3, 403-425-8930.

OCTOBER/OCTOBRE

October 1-3: American Equilibration Society Satellite Program, Hyatt Regency Hotel, Acapulco, Mexico. Contact: The American Equilibration Society, 8726 North Ferris Ave., Morton Grove, Illinois, 60053, 312-965-2888.

October 4-5: Eighth International Congress of Dental Technicians, Cologne, Germany. Contact: Messe-und Ausstellungs Ges. m.b.h., Koln, Messeplatz, Postfach 210760. D-5000, Koln, 21, Deutz.

October 18-20: The American Association of Public Health Dentistry 47th annual meeting, Atlanta, Georgia. Abstracts must be submitted by May 1, 1984 to: Dr. Myron Allukian, Program Chairman, 818 Harrison Ave., Boston, Mass. USA, 02118.

October 18-20: Canadian Academy of Prosthodontics Annual meeting, Toronto, Ontario. Contact: Dr. B.M. Jackson, 22-22 Water St., S. Kitchener, Ont. N2G 4K4.

October 28: Dental Horizons Inc. is presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice", Bronx New York. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, New York, 10468, 212-933-5510.

NOVEMBER/NOVEMBRE

November 5-10: 11th Asian Pacific Dental Congress, Excelsior Hotel, Hong Kong. Contact: Congress Secretariat, International Conference Consultants, 57 Wyndham St., First Floor, Central, Hong Kong.

Dentist

The Department of Health, Northern Health Services Branch, requires a Supervising Dentist for the northern children's dental program. The program includes treatment, prevention and education, and treats northern children aged three through sixteen. The program is a team approach utilizing dentists, dental therapists and dental assistants. Extensive travel by road and small aircraft is involved.

To qualify, you will have a degree from an accredited School of Dentistry and be eligible for licensure with the College of Dental Surgeons of Saskatchewan. You should also have experience in pedodontics and/or public health dental programs and an interest in community development and sensitivity towards cross-cultural differences. The successful applicant will reside in La Ronge.

Salary: $48,576 - $60,072
Closing Date: As Soon As Possible
Competition No.: 613020-4-7037-CND03
Saskatchewan Health

Applicants will be evaluated on the relative degree to which they meet the knowledge, skills and abilities related to the position assignment.

Forward application forms and/or resumes to the Saskatchewan Public Service Commission. Please quote position, department and competition number on all applications and/or inquiries. When mailing applications, please include our postal code, as required by Canada Post Corporation.

Saskatchewan Public Service Commission

728 Spadina Cres. E
Suite 202
Saskatoon, Canada
S7K 4H7
(306) 664-7079

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BRITISH COLUMBIA—Tumbler Ridge. April 30, 1984, fully equipped dental office in Tumbler Ridge, B.C. Two restorative operatories, private office and lab. One dentist catering to this prosperous busy mining community with over 5,000 employees in two big coal mines. Contact: Dr. Patricia Hunter, General Delivery, Tumbler Ridge, B.C., V0C 2W0, Telephone: 604-242-5271.

BRITISH COLUMBIA—Vancouver. Well established preventive practice in the West Point Grey area of Vancouver. Outstanding opportunity for individual dedicated to excellence in dentistry. For details contact: Dr. Robert Munn, (604) 224-9375.

BRITISH COLUMBIA—Greater Vancouver. Practice for sale sharing facilities with one dentist in White Rock, 30 minutes from downtown Vancouver. Facility sharing basis. High gross, low overhead, modern 5 operatory (3 fully equipped), full lab, staff room, private office, panelipse, nitrous oxide, and hospital privileges available. Excellent opportunity in area with great growth potential. Office only 18 months old, 1600 square feet. For details, contact Oceanside Dental Clinic – (604) 531-5222 or (604) 732-8731.

BRITISH COLUMBIA—Vancouver. Excellent opportunity, newly equipped family practice for sale. Good location. Low overhead. Please call (604) 261-1020, after 7:00 p.m.

ALBERTA—Busy well established general practice situated in modern building. Two fully equipped operatories. Full time hygienist shared with one other dentist. GE panelipse and two extra operatories with r.i.p. hospital privileges available. Contact: Dr. K. Pendleton, #201-5704-44 St., Lloydminster, Alta. or call 403-875-2727 (work) or 403-875-2981 (home).

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QUEBEC—Retiring? Moving? Young progressive dentist in modern dental office in Snowdon area wishes to purchase practice of a dentist in Snowdon-Cote des Neiges area. In strictest confidence. Contact me via post office box 1226, Snowdon, Montreal, H3X 3Y3.

QUEBEC—Montreal Metropolitain. Près de métro. Grande clinique pour 2 dentistes et plus, 5 chaises. Panoramique. Décoration moderne. Clientèle stable. À vendre sans intermédiaire cause de santé. Conditions discutables. Bail très raisonnable pour 9 ans. Écrire à: Journal de l'ADC. C.P. 2206.

QUEBEC—Montreal. Office space available in modern, centrally located medical building in downtown Montreal. These spaces are fully equipped with special pure compressed air, central air conditioning, waiting room and nurse's station, as well as examining rooms and partitioning to your specifications. Special rents are available for beginning practitioners, inquiries may be directed to Miss G. Perron and/or Mr. D. Zap, administration office 514-989-5086.

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or Dr. Richard Suen, 4122-15th Ave., Prince George, B.C. V2M 1V9.

BRITISH COLUMBIA—Greater Vancouver. Full time associate required immediately. Excellent opportunity for ambitious, hard-working dentist. Please call 604-590-2615 Mon-Thurs., 8 am to 4 pm.

ALBERTA—Leigh and Associates Family Dental Centres: Partnerships/Associateships. Practice opportunities in some of Canada's most prestigious group dental centres. Ambitious experienced young dentists with high ethical standards are welcome to apply. Our centres have a reputation for being among the finest equipped and most modern in the country. For information: Edmonton, West Edmonton Mall: 403-487-0049; Hamilton, Lime Ridge Mall: 416-387-5333; London, Ontario: 519-434-7755. Other locations in 1984.

ALBERTA—Very busy practice urgently requires associate. Contact: Dr. Zuch, 14938 Stony Plain Rd., Edmonton, T5P 3X8. Ph: (403) 483-7079.

ALBERTA—Calgary. Pedodontist. Full time associate position available immediately. Must have Canadian National Boards and be eligible for certification in Alberta. Please reply in confidence to: Dr. L. Smith, #401, 320, 23 Ave, S.W., Calgary Alberta, T2S 0J2 Canada.

ALBERTA—Edmonton. Well established practice in downtown location. For Associateship or sub-lease. High percentage adult patients, 60 per cent with insurance. Contact: Dr. K. Klem, 510 Empire Building, Edmonton, Alta. T5J 1V9, Phone Res. 466-8533 after 6.

ALBERTA—Edmonton. Associate required from June 1, 1984. Contact: Dr. N. Manji at Center 104-5240 Calgary Trail, Edmonton, Alta., T6M 5G8, phone: 403-435-0182.

ONTARIO—Winchester. Associate required for established associateship practice in Winchester, 30 miles south of Ottawa. Available immediately on a full or part-time basis. Possible partnership in practice for right individual. Contact: Dr. R.D. Wells, 613-774-2615 or write: P.O. Box 729, Winchester, Ontario, K0C 2K0.

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ALBERTA—Calgary. Orthodontist. To establish a private practice in a shared office space with a well established pedodontist. Please reply in confidence: Dr. L. Smith, #401 320 23 Ave. S.W., Calgary, Alta., T2S 0J2, Canada.

ONTARIO—Kingston. Help Wanted. Dentist: to join other dentists in providing part-time professional services at a fully-equipped dental operatory in a federal penitentiary near Kingston, Ontario. Competitive contractual terms. Position open 1st April 1984. For further details contact: Dr. R. L. Brennan P.O. Box 1174, Kingston, Ontario. K7L 4Y8, or telephone 613-547-4346.

ONTARIO—University of Toronto, Faculty of Dentistry, wishes to develop a Clinical Research Unit. It is eligible to apply for a Development Grant, and accordingly invites applications from Clinical Scientists who wish to be associated with this development. Candidates should have a Ph.D in Physiology, Psychology or a related subject, and at least two years of post-doctoral training. Preference will be given to persons holding a dental degree and with a demonstrated record of productive research in a clinical (i.e. dental) sciences environment. The successful applicant will be expected to conduct clinical research into oral and facial pain and to teach in this area. Salary and academic rank commensurate with experience. Applications, with complete C.V., list of publications and the names of three references, should be directed to Dr. A.R. Ten Cate, Dean, Faculty of Dentistry, University of Toronto, Toronto, M5G 1G6, Canada. Closing date for applications is April 30, 1984. In accordance with Canadian Immigration requirements, this advertisement is directed to Canadian citizens and permanent residents.

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ADVERTISERS INDEX

Allan's Travel Service Ltd. 302
Block Drug 268, 309
John O. Butler Co. 286
CDSPI 299, 301
Colgate Palmolive Inc. 266
Cooper Laboratories 285
Dent-Appeal Enterprises 302
Erta Inc. 333
Hoechst Canada 313, 324
Darrell Kent Real Estate 269
Lactona Corp. 323
M. McLellan 319
McNeil Consumer Products Co. . 267, 333
C. V. Mosby 303
N.E.C. Corporation Canada 304
Nobilium 300
Novocol Chemical Mfg. ..... IBC
Pfingst 302
Philips Dental Systems 279
G. C. Porter Interior Design 309
Procter and Gamble Inc. ..... IFC
Royal Berkshire Hospital 269
Saskatchewan Public Service 330
Henry Schein Inc. 274, 275
Upjohn 276, 284
Warner Lambert Inc. ..... OBC, 314
Williams Gold Dental Refining 280

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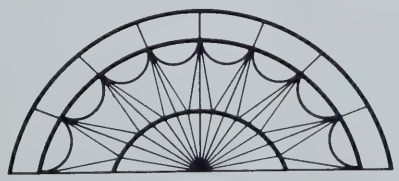

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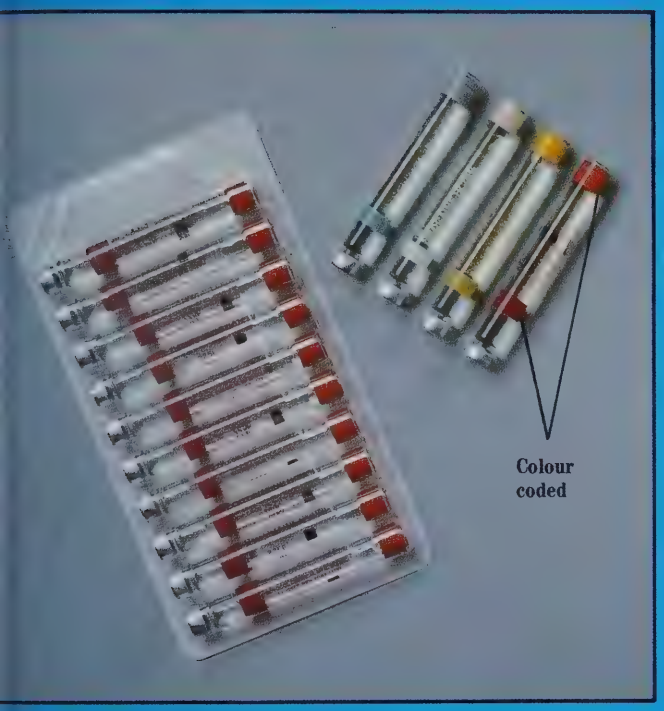

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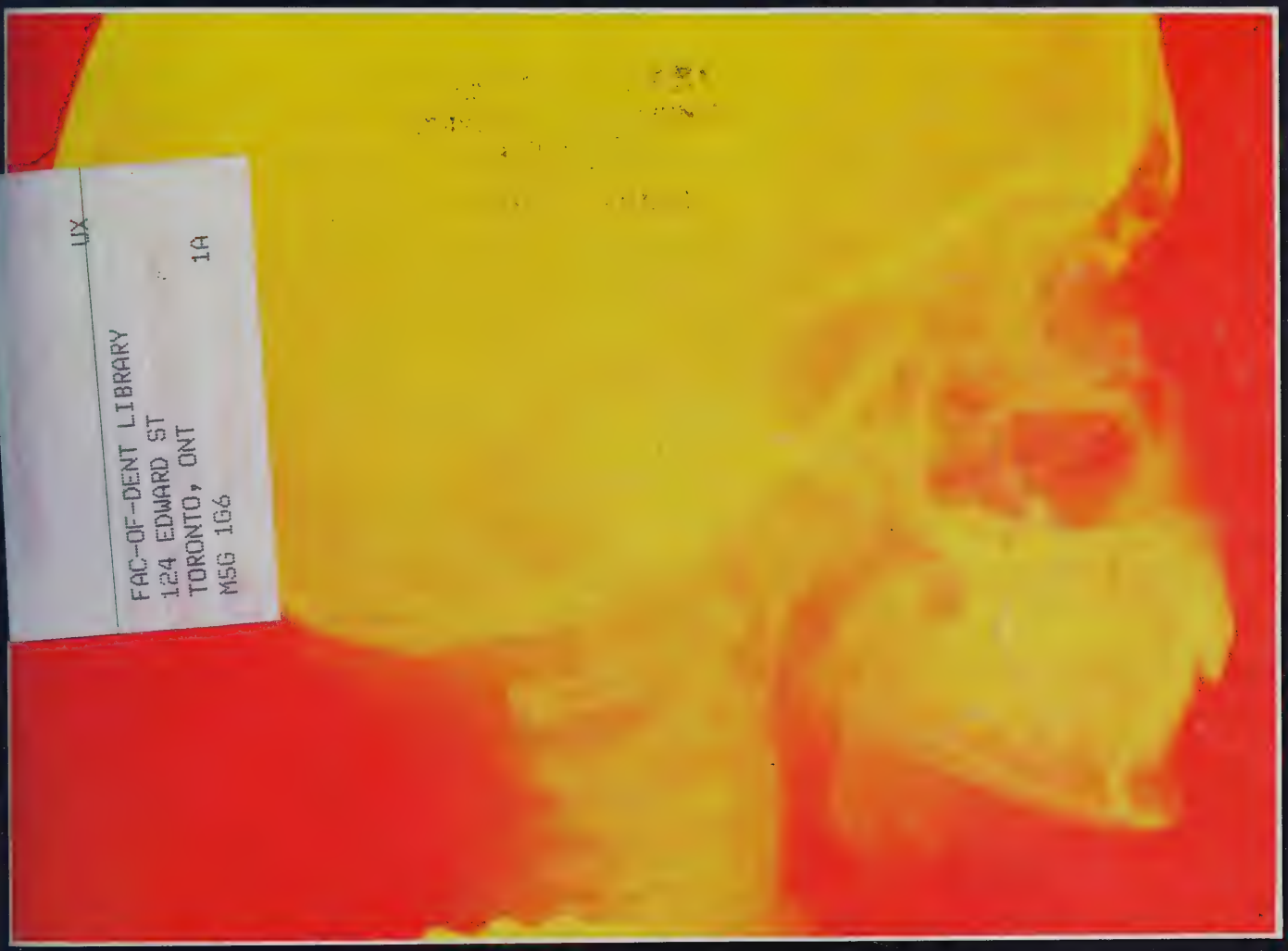

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May/mai 1984 Vol. 50 No. 5

JOURNAL

Canadian Dental Association
de l'Association Dentaire Canadienne

GUEST EDITORIAL 337

Private practitioners can have an influence on the quality of dental education in this country. Dr. Eisner explains.

NEWS UPDATE 339

Sports Dentistry

Dr. Art Wood is a Canadian pioneer in inventing and developing better and more effective protective devices for youngsters involved in contact sports.

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Development of a facially-featured headform to test protective devices for contact sports is a fascinating example of multidisciplinary cooperation.

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Quite a lot, Executive Director Hubert Drouin explains, in an article outlining activities and achievements in behalf of the dental profession.

BRIEFLY 347

Dental news items from across Canada and around the world.

LETTERS 349

The Executive Council of the Canadian Dental Hygienists' Association is impressed with the "Very attractive graphics and layout" of the new CDA Journal.

CDA RESOURCE CENTRE 350

A listing of articles available in the CDA Resource Centre/Library on the subject of Root Canal Therapy.

BOOK REVIEWS 351

Atlas of Complete Dentures
Tooth-Coloured Filling Materials in Clinical Practice
Preventive Dentistry

ARTICLES

CONFESSIONS OF A DENTAL PHOBIC 356
By John Walker

EXPENDITURES ON DENTAL SERVICES IN CANADA 362
By Dr. J. L. Leake

SCIENTIFIC

SYMPOSIUM 25

WHY STUDY THE NORMAL PHYSIOLOGY OF THE PERIODONTIUM? 373
Dr. A. H. Melcher

ACUTE EXACERBATION IN CHRONIC PERIODONTAL DISEASE 380
Dr. J. Max Goodson

PATHOGENESIS OF PERIODONTAL DISEASE: NEW CONCEPTS 391
Dr. Robert J. Genco

EKTASPEED AND A SCREEN/FILM SYSTEM COMPARED WITH ULTRA-SPEED IN THE INTERPRETATION OF EARLY PROXIMAL CARIES 397
Dr. Stanley Kogon et al

THE ALARA CONCEPT; POPULATION EXPOSURES FROM X-RAYS IN DENTISTRY 402
Dr. Dale E. Gelskey et al

PRECISE SELECTIVE ANAESTHESIA USING A PRESSURE SYRINGE 404
Dr. Bruce Chenail et al

RRSP 347

OBITUARIES 352

ANNOUNCEMENTS 407

MARKETPLACE 411

ADVERTISERS' INDEX 412

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THE IMPACT OF PRIVATE PRACTITIONERS ON THE QUALITY OF DENTAL EDUCATION

Individual and collective beliefs are powerful motivators. Although we acknowledge that some communities and population groups could be better served by our profession, the poor economy and the large increase in North American dental graduates in the 1970's have resulted in appointment books and dental chairs which are not always full. The bottom line is that most individual practitioners and their dental organizations believe that there is now an oversupply of dental manpower and that this will continue into the foreseeable future. While it can be postulated that a two or three percent increase in our profession's share of the demand market would also serve as a method of regaining our economic equilibrium[1], it is evident this belief is not as widely held as the belief that current dental manpower levels should be reduced.

The debate will continue, and in the meantime, the economy and patterns of dental disease will fluctuate, and alternate forms of dental care delivery will be developed. During the ten to twenty years it will take to develop answers to this manpower vs. market share debate, I am concerned that we do not inadvertently diminish our profession's most valued assets, its entering students and the Faculties which teach them and conduct dental research. Consider for a moment, two important ways in which practitioners have a direct impact on the quality of our profession's academic establishments – through their control of student quality and faculty quality.

Student Quality

Many dentists are asked to participate in "career days" at the local high school and invariably a few young patients inquire about becoming a dentist. With the beliefs about the present and future oversupply of dentists being so widely discussed, it might be tempting to discourage such inquiries and outright recruitment would be out of the question. I suggest however, that such a response would be devastating to the profession. One can argue logically for a reduction in class size in each Faculty while continuing to promote a large and high quality applicant pool. We should encourage all prospective applicants, and actively recruit those who are intelligent and committed to the goals of our profession.

Faculty Quality

Good students are frequently recruited for graduate school and subsequent faculty appointments, thereby allowing our teaching and research endeavors to continue with the best available personnel. In recent years, delegations from organized dentistry have approached Deans and University Presidents with requests to cut dental school enrollment. I do not quarrel with their right to make such requests, but since academics and practitioners are partners in the profession, I would hope that arguments for enrollment cutbacks might be put forward in a manner which will be ultimately helpful to practitioners, the Faculties and profession rather than being harmful. University administrations and provincial governments are all struggling within the severe financial constraints of our current national economy. To their leaders, the words "enrollment cutback" could easily connote parallel budget cuts. When most Faculties are desperate for research support, updated equipment or facilities and improved opportunities for continuing education, especially clinical participation courses, it would be very helpful to the Faculties if these discussions gave support to an internal reallocation of the Faculty's resources, rather than on enrollment cutbacks. Consider the strength of the profession's arguments if their emphasis focused principally on increased budgetary support which could, in part, be facilitated by a reduction in enrollment. Here again the practitioner can support and the leaders of our professional associations can convey a direct concern over the quality of our academic enterprise.

The foregoing arguments suggest that in today's "scarce resource" economy, anything less than regular and strong advocacy for the quality of incoming students and the financial support of our Dental Faculties will ultimately hurt the quality of our practitioner graduates and eventually the quality of our profession. The belief that enrollments are too high should be supplanted or at least accompanied by the equally strong belief that the quality of our profession's future depends on the wisdom of its current members.

In conclusion, I would propose that all dentists directly involve themselves with preserving and enhancing the quality of our profession by recruiting good students to our ranks and arguing, both provincially and nationally, for the best possible support of the research and teaching programs within our Faculties during these economically challenging times.

1. Demand for Dental Services (Monograph #2) R.K. House and Associates, Ltd. Prepared on behalf of the College of Dental Surgeons of British Columbia.

John Eisner, DDS, PhD

Dr. Eisner is the Assistant Dean of the Faculty of Dentistry at Dalhousie University, Halifax, N.S.

PAEDODONTIST IS DEDICATED TO ELIMINATION OF SPORTS INJURIES

Until recent years, there was a steady flow of youngsters with loose, chipped or broken teeth, into dental clinics across Canada.

The number of victims of sports injuries was growing by leaps and bounds until an Islington, Ontario, paedodontist felt compelled to do something about it.

Dr. Art Wood's zeal to eliminate what he considered unnecessary sports injuries has done much to reduce this parade to a mere trickle.

A graduate of the University of Toronto's faculty of dentistry in 1943, Dr. Arthur S. Wood, DDS, Dip. Paedo., FRCD(C), has spent nearly 33 years developing, producing and testing protective devices for young athletes involved in contact sports such as hockey, lacrosse and football.

His expertise and achievements in this field are now known and respected internationally.

His concern and enthusiasm haven't diminished in the least over those years. If anything, they have increased, because today, his concerns are shared by a whole sympathetic team of professionals, who, with the aid of sophisticated modern technology and financial resources, can achieve goals Dr. Wood only dreamed about a few years ago, and in a much shorter time frame than he would have thought possible.

CDA Representative

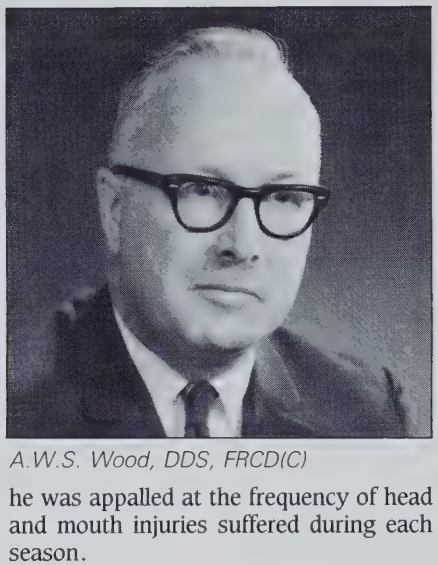
Since 1970, Dr. Wood has been Canadian dentistry's spokesman as a member of the Canadian Standards Association's Technical Committee for Evaluation of Protective Equipment for Athletes. The committee was established in that year, and Dr. Wood was named representative of the Canadian Dental Association.

The committee was formed, Dr. Wood told the Journal, largely because of his complaints about the quality, or lack of it, in sports protective equipment on the market at that time.

He had appeared in a television interview and complained about the necessity for more effective protective gear and the prevalence of "junk" on the market.

Zeal Kindled in 1952

His personal mission began in 1952, when, as coach of a team of youngsters in a Toronto Metro area minor hockey league,



A.W.S. Wood, DDS, FRCD(C)

he was appalled at the frequency of head and mouth injuries suffered during each season.

Not content to sit back and let someone else solve the problem, Dr. Wood accepted the challenge personally. A fellow coach, Charlie Patterson, who was an engineer and researcher at York University in Toronto, agreed to assist him. (Mr. Patterson also became widely known for the development of protective sports helmets.)

The basement of Dr. Wood's home became the research and development centre. Here the two men studied the nature of sports hazards, designed, and actually made, various types of protective devices for the head and oral regions. They were then tested under actual game conditions.

If the gear didn't prove effective, it was back to the drawing board in Dr. Wood's basement.

While Dr. Wood concentrated on the dental area — mouthguards — Mr. Patterson worked at perfecting protective helmets.

Dr. Wood's achievements won him the respect and gratitude of parents, fellow coaches and the players themselves. For this he earned the title — "Father of the Mouthguard" in Canada.

In recognition for his many hours of voluntary work and considerable personal expense, Dr. Wood was named to the Mississauga, Ont., Hockey Hall of Fame.

Recent Developments Exciting

Dr. Wood and his CDA alternate on the CSA Technical Committee, Dr. Frankin Pulver, have found recent achievements, with the assistance of modern technology, much more exciting.

The 67-year-old paedodontist becomes very animated when he explains a recen development of international significance For many years the CSA Committee ha been attempting to find a head model of a average seven to 10 year old boy, to prop erly evaluate the effectiveness of newly developed hockey helmets and face guards

Just over one year ago, a task force wa named, calling on the expertise of profes sionals who provided input in anthropo ogy, opthalmology, dentistry, plastic sur gery, restorative prosthetics and compute science, to develop a headform with huma features, to exact proportions.

The data and dimensions were provide to the restorative prosthetist, who sculpte the facial features of an average seven yea old boy (later dubbed "Allan Average"), i clay. This model was accepted by the CS Technical Committee, and Drs. Wood an Pulver indicated on this headform the ora areas that required protection. It was the sent to Ottawa, Ont., where a mold wa made and a durable plastic headform wa created that would not shatter under impac during testing.

The headform (the development of whic is described in detail in another feature stor in this edition of JCDA) is the ultimate veh cle for testing the fit and effectiveness c head, facial and oral region protectiv devices, and to enable CSA to establis standards.

The headform has been described by CSA Committee member as a forerunner i the international field in this area "Dr. Wood is particularly proud that "der tistry played such a major role" in its deve opment. He said the committee is also grat ful that the federal Consumer and Corporat Affairs department made funding availabl for the project — about $33,000. Th Americans are still "trying to achieve this, Dr. Wood said. "They've spent nearl $400,000 and haven't been able to do yet," he told the CDA Journal.

Encouraged by this success, the commi tee now hopes to design a similar headfor representing females in the same ag bracket.

CSA Committee

The CSA Technical Committee include personnel from professional and amate sports organizations and leagues in Canad and the United States, representatives sporting goods manufacturing firms, eng neers, members of other scientific fields an

physicians and dentists. It is concerned basically with the nature of sports injuries, factors causing them, the design of necessary protective equipment and expediting the development and manufacture of this equipment to reach the market as soon as possible.

Equipment already on the market is also tested to determine efficiency or lack of it. Sophisticated technology includes a device which will shoot a puck at a face mask or helmet at speeds up to 144 kilometres per hour, to determine any flaws in the equipment.

A steady flow of sports injury statistics is studied and new areas of concern continue to be identified.

In line with CSA objectives, the committee helps draft desirable standards for protective equipment before it is made available in the marketplace.

The committee's first priority was setting standards for hockey helmets for use in Canada. This was realized in 1978. The next challenge was to develop standards for eye and mouth area protection devices. Intraoral mouthguard standards were approved shortly after this date. Dr. Wood's personal input in this area was very considerable.

More recently, the committee conducted a two-year study to devise effective face masks for hockey goal tenders. Statistics were gathered for a period on the nature and causes of oral and facial injuries.

Dr. Wood had personally developed and produced a goal tender's face mask several years earlier, in response to an "emergency" request.

Reason Prevailed

Dr. Wood has been encouraged by the fact that professional hockey and football players have in recent years shaken the concept that mouthguards, helmets and other protective gear, are not masculine.

Over the years, he said, contact sports had created their own mystique. Moving beyond the epoch of tribal battles, frontier dangers and backbreaking pioneer pursuits, the contemporary male is expected to show aggression and bravery on the sports field. Hockey and football are manly games in which participants have been prompted to be indifferent to injury inflicted or sustained. However, reason has finally prevailed and civilization has won another round. Injuries were becoming too prevelant and serious. Coaches, parents and eventually — the players themselves — faced the facts and opted for the protective devices.

These days, minor hockey league players in most centres in Canada are not allowed on the ice unless they are wearing protective gear.

Dr. Wood still believes there is still a long way to go in developing truly effective protective equipment in some areas. The committee is concerned that some of the equipment in itself, creates other potential or real, injury hazards. And occasionally there is still "junk" equipment on the market, some of it endorsed by well-known athletes. He terms some of these protective devices "dangerous."

However, he points with pride to the statistics which indicate "a tremendous reduction" in what were formerly common injuries to the face and oral regions. The mouth is the most vulnerable part of the body in contact sports, he said. That region sustains 16 per cent of all sports injuries and "nine per cent of all injuries are to the teeth."

Another of the committee's current concerns is the prevalence of injury to young hockey players when they are slammed into rink boards. The possibility of more flexible boards is being investigated. There has also been discussion as to whether hockey rules may be changed to outlaw body checking in the area close to the boards.

Prominent Paedodontist

A prominent member of his own specialty field, paedodontics, Dr. Wood has served as president of the Canadian Society of Dentistry for Children and the canadian Academy of Paedodontics. Colleagues, however, say he is much more interested in preventing oral injuries that in treating them.

The work and discoveries of the CSA Technical Committee are known and shared internationally and Dr. Wood's contributions are known just as widely.

His work has long been known and respected by like-minded American dentists, and when the Academy of Sports Dentistry was established in San Antonio, Texas, in June, 1983, he was on hand as a founding member. He is the only Canadian member of that international body's executive council. The Academy's constitution and bylaws, however, will admit any Canadian dentist interested in the field as a full or affiliated member.

Anyone who is conducting or has conducted research, or who is active in the practise of sports dentistry, is entitled to active membership status. The nature and objectives of the new Academy are similar to those of the earlier-established Academy of Sports Medicine, also an international organization.

International Symposium

A familiar figure at symposia and as a speaker on the subject of sports dentistry, Dr. Wood advised the Journal that the Third Annual Symposium for Sports Dentistry is scheduled June 22-23 at Boyne Highlands Resort in northern Lower Michigan. This symposium, sponsored by the University of Michigan and the University of Texas, in conjunction with the Academy of Sports Dentistry, is open to anyone interested in sports dentistry in Canada or the United States. Presentations will touch all aspects of the subject. He advised that information is available from Dr. W.C. Godwin, Department of Complete Denture Prosthetics, University of Michigan Dental School, Ann Arbor, Michigan, 48109.

MULTIDISCIPLINARY APPROACH GIVES BIRTH TO 'ALLAN AVERAGE'

Multidisciplinary cooperation to achieve a common goal is not unusual these days. But seldom in the annals of applied science have those disciplines been so varied as those in the team that developed "Allan Average" — the facially-featured headform that will result in much more effective protective equipment for young Canadian hockey and lacrosse players.

Since the early 1970s, members of the Canadian Standards Association's Technical Committee on Protective Equipment for Hockey and Lacrosse Players — notably the Canadian Dental Association's representative on that Committee, Dr. Art Wood of Mississauga, Ontario — were concerned that no acceptable headform existed for the testing of "tyke-size" hockey helmets and face guards.

Continual searching had revealed headforms without standard dimensions or accurate facial features, and, for the most part, only of adult size.

The Committee's concern was that more and more youngsters in Canada were beginning to play hockey at a younger age and the resulting incidence of injuries to the face and oral regions was alarmingly high.

The CSA Technical Committee as a result, called for the establishment of a task force to develop an effective headform. This group was named early in 1982.

The personnel of the task force were:

Chairman: Dr. James Newman, Director of Engineering, Biokinetics & Associates Ltd., Ottawa, Ont.;

Ms. Adrienne Alison, BSc, AAM, a restorative prosthetist of Sunnybrook Aids for Living Centre, Toronto, Ont.;

Dr. Patrick J. Bishop, Associate Professor of Kinesiology, University of Waterloo, Waterloo, Ont.;

Dr. K.G. Gupta, Chief, Mechanical and Electrical Hazards Division, Consumer and Corporate Affairs Canada, Hull, Qué.

Mr. E. Loevenmark, Certification Division, Canadian Standards Association, Rexdale, Ont.;

Dr. Thomas Pashby, an opthalmologist, Chairman of the CSA Committee on Protec-

tive Equipment for Hockey and Lacrosse Players, Toronto, Ont.;

Dr. Frank Popovich, Director, Burlington Growth Centre, and Professor of Orthodontics, Faculty of Dentistry, University of Toronto;

Mr. Alex Wright, Director, Department of Visual Education, Research Institute, Hospital for Sick Children, Toronto.

Created from skullform

The International Standards Association (ISO) has in recent years developed a number of sizes of skullforms, for the testing of motorcycle helmets. Although these forms lack facial features, the task force believed they represent a reasonable concensus regarding cranial dimensions.

The dimensions of three different sizes of these skullforms were matched with anthropometric (science of body measurement) data, provided by Dr. Popovich, relating to the skull, face and neck areas of an average seven-year-old Canadian boy.

Then the creative work began.

The portion of the skullform in the area of the face, to a point just in front of the ears, was completely removed. This left the skull and the rear half of the neck on which to sculpt the facial features.

From his massive database at the Burlington Growth Centre, Dr. Popovich supplied the necessary anthropometric measurements. These dimensions were particularly helpful in creating the bony landmarks of the head and face.

Dr. L.G. Farkas of the Research Institute, Hospital for Sick Children, Toronto, provided information and dimensions of soft tissue landmarks of the same portions of the anatomy.

Malcolm Campbell of Toronto provided a plaster cast of the face and ears of a seven-year-old male Caucasian child.

The Faculty of Dentistry, University of Toronto, supplied the skull of an eight-year-old.

With the aid of scaled photographs, negative silhouettes in cardboard, piano wire and plexiglass grids, the team achieved the proper orientation of the head, the placement of the ears and subtleties of the forehead.

Oil base clay was used to fill out the face to the contours of the cardboard profile. Measurements of the facial features of live subjects were useful in fine-tuning the features of the clay model. The clay model sculpting was done by Ms. Alison.

Dr. Tanya Hreczko, an anthropologist with the Burlington Growth Centre, and Marko Katic, a biostatistician working with Dr. Farkas at the Sick Childrens Hospital Research Institute, made a final check of the clay model. They verified facial measurements using sliding calipers, spreading calipers and soft metric tape. Some trimming and cutting back was done to achieve exact dimensions. Removable ears had been developed in wax, a more durable substance than clay. These were mounted on the headform with screws.

Accepted in April, 1983

The completed headform in clay, the first phase of two separate contracts awarded through Consumer and Corporate Affairs, was presented to the CSA Technical Committee in April, 1983. Members found it acceptable and urged that a finished prototype in high impact plastic material, should be produced as soon as possible.

Dr. Art Wood and his CDA alternate on the CSA Technical Committee, Dr. Franklin Pulver, were called upon at this point to identify the exact area around the mouth of the model where protection was required. Those areas were inscribed in the headform.

The clay model was then carefully packed and shipped to Ottawa, Ontario, where Biokinetics & Associates Ltd., prepared a mold and produced the first catalyzed aluminzed epoxy headform prototype.

The accurately designed and crafted headform now makes it possible to determine the exact size necessary for chin protectors, mouth and faceguards and helmets, to ensure the optimum in protection for young hockey players.

Effective smaller and lighter hockey helmets have for some time been the goal of the Technical Committee. But how much smaller, has been a frustrating unknown until now. The helmets must fit the young boy's head properly to be effective. Dr. Wood has pointed out that previously oversize helmets would slip out of position, sometimes resulting in the very injuries the helmets were intended to prevent.

Encouraged by this success, the CSA Technical Committee now has plans to develop a female headform in the same age group, and some larger sizes for more mature athletes. With the statistics developed and resources discovered in this pilot project, the Committee believes the task will be much easier and less costly.

Unique in the world

The headform, which is unique in the world, according to Dr. Pashby, removes all elements of speculation when drafting specifications for protective equipment. The CSA has recently conducted highly successful evaluations of helmets and face protectors on the headform and the initial drafting of specifications for the manufacturers of the equipment to CSA standards, has already begun.

The CSA hopes to have the new equipment into production and on the market in time to outfit young hockey players for the 1984-85 season.

Front view of new headform

New headform with "tyke" helmet and face protector in place

Acknowledgement

The Journal extends thanks to Consumer and Corporate Affairs Canada, for providing copies of reports prepared by the Canadian Standards Association in April and November of 1983, in which details of the development of "Allan Average" were recorded.

"CDA Endorses the Use of Silver/Copper Amalgam as a Restorative Material"

This report on a symposium on "The Use of Mercury and Amalgam in Dentistry" was first published in the JCDA late last year. The subject matter, however, continues to be of such interest that it was considered appropriate to reprint it at this time.

Practitioners from various parts of Canada have brought to the attention of the Canadian Dental Association concerns expressed by a few members of the general public about possible side effects which may be associated with the use of dental silver amalgam as a restorative material.

An Ad Hoc Committee of the Council on Dental Materials and Devices of the C.D.A. met on May 27, 1983. After a review of the literature and from discussions in the Committee and within the professions, there appears to be a very small number of persons showing probable amalgam sensitivity. The number when accurately documented, is very low compared to the vast number of amalgam restorations that have been placed.

Amalgam has been generally accepted by the dental profession for the past 80 years or so. Although some concerns have been occasionally expressed about its use, such concerns have not been supported by scientific evidence. During the past five years, various laboratory and clinical trials have demonstrated the superior clinical performance and stability of the newer formulations of alloys for amalgam. These improvements are the result of original Canadian research (Innes and Youdelis, 1963) and of the development of improved handling techniques. When a restorative is required, amalgam is still the material of choice for restoring the majority of decayed posterior teeth.

The individual patient is exposed to mercury from a variety of sources such as industrial pollution, paint, smoking and diet. Exposure from amalgam fillings has not been demonstrated to be greater or more harmful than that arising from other minor background sources. Research and clinical experience has shown that sensitivity to some metals may occasionally be a possible source of a dental patient's problems; mercury is only one of these metals; the amount of mercury absorbed as a result of having an amalgam restoration placed is very small and is less than the amount obtained from certain diets and the environmental effects of modern life.

In the light of present knowledge, the Canadian Dental Association's Council on Dental Materials and Devices agrees with the following statement released by the American Dental Association, "Except in individuals sensitive to mercury, there is no reason why a patient should seek to have amalgam restorations removed." (J. Amer. Dent. Assoc. 106, 519-520, 1983.)

Dentistry must be concerned, however, about keeping to a minimum the absorption of any foreign substances involved in dental treatment. The Canadian Dental Association's Council on Dental Materials and Devices strongly advocates the use of the most corrosion-resistant alloys, the use of the recommended alloy/mercury ratios, the use of rubber dam to control and collect all debris together with the efficient use of high-speed evacuation systems by the dental assistant, and the rigorous implementation of the CDA mercury hygiene recommendations (1979). It should go without saying that the removal of existing amalgam should only be performed with water spray and high-speed evacuation. Cutting amalgam dry has been shown to be a primary source of mercury for both dental personnel and patients.

Council encourages controlled clinical research studies involving individual patients considered to be sensitive to dental amalgam in order that a sound scientific basis be established for reaction to such restorative materials. Such controlled studies would require an assurance that patients had not swallowed or ingested amalgam debris during placement of any fillings, the age and composition of the filling should be known; and there should be an assurance that the alloy/mercury ratio and the method of placement were acceptable.

The Council on Dental Materials and Devices strongly endorses the principle that clinical treatment of suspected mercury sensitive individuals should not depend solely upon the dentist's diagnosis, but should always include an assessment by a qualified dermatologist or allergy specialist. Testing for metal sensitivity is not a simple matter and does require expert interpretation.

In conclusion, it should be pointed out that no wide spread sensitivity to mercury among dentists and dental personnel, who may be exposed to much higher levels of mercury absorption, has been established. In a sense, the members of the dental profession themselves could be regarded as a comparative test group who have been exposed to low levels of mercury over long periods of time.

The possible hazards to dental personnel arising from exposure to mercury vapour in the dental office have been well documented (Jones et al, 1983) and dentists should ensure that the recommended working procedures are followed to minimize any risk.

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ALLIGATORS PUT THE BITE ON CLEFT PALATE

Baby alligators, even before they are born, may soon be helping human babies who could be born with cleft palate.

Dr. Mark Ferguson, of the department of anatomy, Queens University, in Belfast, Ireland, is using alligator eggs and alligator embryos to research and study the formation of and factors that cause cleft palate in humans. He is the first researcher in any field of medicine or dentistry to use these reptiles for research purposes.

According to much of current cleft palate research, a small percentage of women may be genetically susceptible to having babies with the handicap. It is believed, however, that the handicap is largely dependent on external factors present during pregnancy. Research into identifying these factors could help women at risk to avoid such external factors during pregnancy.

Dr. Ferguson wanted for his research, an animal whose jaws mimicked the human mouth, yet would not be affected by carry-over characteristics from the mother, as happens with conventional lab animals such as rats or mice. Alligators, whose young are hatched from eggs, fit the criteria.

Dr. Ferguson, in working with alligator eggs has been able to induce cleft palate in the unborn alligator embryos, using various chemicals.

"My work has also shown the biochemical mechanism by which a cleft is produced," he said.

Using instruments which he invented himself, Dr. Ferguson has also been able to correct cleft palate surgically in unborn alligators.

"There was no scarring when they were born, as with adult plastic surgery, and this holds out hope that at some point in the future, the techniques might be applied to human babies," he said.

Dr. Ferguson gathers the alligator eggs for his experiments in Louisiana and uses the facilities of the Laboratory of Developmental Biology at the University of Southern California for his research. The eggs must be worked on within 12 hours of collecting them.

For his research on cleft palate, Dr. Ferguson won the 1981 achievement award of the Alumni Association of the Student Clinicians-American Dental Association. He was the youngest and first non-American recipient of the award.

(International Press Service Photo)

Following his investiture as a Commander of the Peruvian Order of Merit, Robert "Bob" McAllister (third from right), posed with other guests of honor. They are, from the left: Peruvian Ambassador to Canada Juan Pablo Fernandini; Mrs. Joyce McAllister, Mrs. Margaret Catley-Carlson, President of the Canadian International Development Agency; Dr. Pablo Cano of Sudbury, Ontario, a colleague of Mr. McAllister in the aid to Peru program, who received the award, Officer of the Order of Merit; Mr. McAllister, Mrs. Fernandini and Mrs. Cano.

PERUVIAN DECORATION FOR BOB McALLISTER

Robert "Bob" McAllister, the man who has collected and delivered many tons of much-needed dental and medical equipment to Caribbean countries, was created a Commander of the Peruvian Order of Merit at a recent ceremony in Ottawa.

The honor was conferred by the Ambassador of Peru, Juan Pablo Fernandini.

Mr. McAllister has in recent months arranged the shipments of a large quantity of donated dental and medical equipment to Peru.

Dr. Pablo Cano, a medical specialist who practises in Sudbury, Ontario, and who has become closely associated with Mr. McAllister in his work in Peru, was decorated as an Officer of the Order of Merit.

Mr. McAllister said Dr. Cano, a native of Peru, had provided a "great deal of assistance" in identifying the areas of need in Peru and introducing him to Peruvian health officials.

'Proud Canadian'

"I am proud, as a Canadian to have been treated with so much respect for the work I have been attempting to do" in Peru, Mr. McAllister said. He also thanked those Canadian agencies, including CIDA, and individuals, who have assisted in his efforts to provide equipment where it is so sorely needed.

The citations, signed by the President of Peru, Fernando Belaunde and Minister of Foreign Affairs, Fernando Schwalb, stated the honors were in recognition of "distinguished services," to the Republic of Peru.

Thanks to CDA

Mr. McAllister told the Journal he was grateful for "all the Canadian Dental Association has done for me."

Making his mission known across Canada "has helped me tremendously," he said.

He also had high praise for the CDA dental health and fluoride mouthrinse program for elementary school children in St. Kitts/Nevis, in the Caribbean. Mr. McAllister had been in the area recently and noted that the program "is proving to be a highly successful one."

Not just ceremonial

As is typical with "super-scrounger" McAllister, his visit to Ottawa was not just for ceremonial reasons. Before he left the ambassador's residence, he was discussing how to get donated trucks to southern destinations, and when he would next be in Peru to help with the unloading of another shipment of medical equipment.

NEWFOUNDLAND DENTAL ASSOCIATION HONORS FIVE MEMBERS

Five corporate members of the Newfoundland Dental Association were recently awarded Certificates of Merit for their years of service and dedication to their association and the dental profession.

Those honored were: Dr. Reginald Ball of Grand Falls, and Drs. Bruce Bowden, James Darcy, Edward Kavanagh and David Peters, all of St. John's.

In addition to the Certificate of Merit, Dr. Ball also received a Life Membership in the NDS.

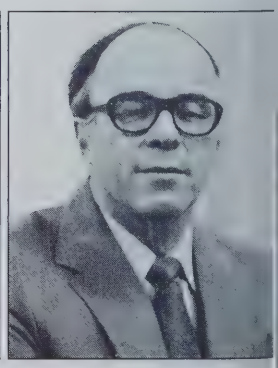
Dr. Ball has been practising dentistry in Newfoundland for the past 41 years and continues to be an active and valued member of the Association. He was a member of the National Dental Examining Board for 19 years – 1952-71. He is presently practising in Grand Falls, Newfoundland, and has been a member of the Newfoundland Dental Board since 1978.

Dr. Reginald Ball

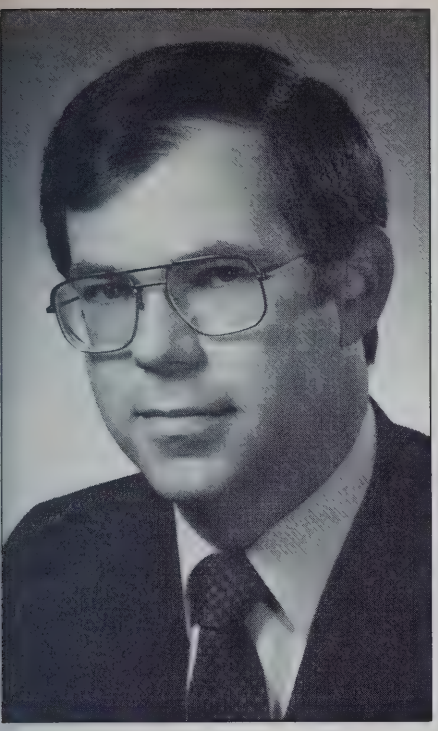
Dr. Bruce Bowden

Dr. James Darcy

Dr. Edward Kavanagh



Dr. David Peters



Hubert E. Drouin

WHAT HAS THE CANADIAN DENTAL ASSOCIATION DONE FOR YOU LATELY?

By Hubert Drouin, Executive Director

Quite a lot, but many Canadian Dentists appear to be unaware of the range and importance of activities the Association undertakes on their behalf. Some activities are regular, ongoing CDA programs. Included in this category are the Accreditation of Dental Education Programs and of Hospital Dental Services, as well as a Dental Aptitude Testing service, a very popular resource library service and an annual convention and scientific program. Other activities such as communication with government on behalf of the dental profession receive greater or lesser emphasis as needs dictate.

For the last two years, CDA has been tremendously active in the latter area. In 1982, the CDA Taxation Committee initiated a joint profession committee (involving the Canadian Medical Association, the Canadian Bar Association and the Canadian Institute of Chartered Accountants) to study methods of improving the regulations regarding pre-tax pension contributions for professionals operating small businesses. A detailed brief was submitted to the Parliamentary Task Force on Pension Reform. The subsequent report of the Parliamentary Task Force unquestionably attempts to address some of the issues raised in the joint profession brief. While the recommendations of the Task Force are general, they roughly parallel, almost point by point, the recommendations of the joint brief. Critics of the recent federal budget charged that proposed changes in tax sheltered contributions to registered retirement savings were partly as a result of lobbying by the "Professionals". If the Task Force Report is appropriately followed up and the Finance Department proposes related changes in pension contribution assessment, the pension needs of the small self-employed businessman will eventually be met in a more equitable and satisfactory fashion.

Tax auditing

Another example is the CDA's continuing debate with Revenue Canada over the aggressive tax auditing of management companies of many dental practices in Canada. In November, 1983, Dr. Robert Hicks, CDA President, described the situation as follows:

> "Unknown to tax advisors (accountants and lawyers) and dentists, Revenue Canada no longer accepts a 15% mark-up on **all services** provided by management companies as a service charge to their client – the professional practice. Their new rule is that 15% mark-up may only be applied to **certain** costs, i.e. those classified as "direct costs" incurred by the management company in providing all services to the professional practice. The problem is that this new rule is being applied to audits performed in 1980, 1979, etc. practice years, even though the new rule was only formulated in 1981 – in other words, "retroactive taxation" is occurring. In addition, audits of professional management companies for the years after 1981 will not permit "credit" to be given for taxes paid by the management company on profits when the disallowed service charges are returned and taxed at the professional practice rate of taxation. This is a prime example of "**double taxation**"."

In a CDA brief in response, presented to the Director General of the Compliance Directorate of Revenue Canada, Dr. Hicks pointed out that CDA contends that Revenue Canada's assessment of what is a "reasonable charge" for management services is unrealistic and unjustified. The CDA brief stressed that "fair market value" is a good test of reasonable charges, and that a study done by R.K. House and Associates for CDA showed that non-arm's length management companies charge approximately 15% of all dental practice expenses as a service charge while arms-length management companies (a market test) charge about 17%. Revenue Canada, in contrast, accepts approximately 4% as a reasonable charge when a non-arm's length professional management company is utilized. Prior to 1981, many professional management companies were audited by Revenue Canada and 15% on market services was accepted as reasonable. New guidelines were supposedly adopted in 1981, but no public communication took place that would have enabled companies to adjust and comply over time. The result, in effect, has been retroactive taxation.

'Double taxation'

Shortly after CDA's brief was presented, CDA was informed that the question of what amounted to double taxation after 1981 had been studied and that it had been concluded "that professional management companies will continue to be allowed an offsetting deduction". While welcoming this news, CDA notes that other concerns raised in the brief have not been dealt with and all CDA members have been urged to write to their Members of Parliament on the matter. CDA, through Dr. Hicks, is continuing its efforts towards obtaining a reasonable approach to assessment of professional management companies. Revenue Canada was most recently informed of the following CDA recommendations:

1. Revenue Canada should immediately clarify its policy and assessing practice by amending its Interpretation Bulletin IT-189.
2. Revenue Canada should for an interim period cease re-assessing taxpayers who have been proceeding as we have outlined. Any processing of appeals or collections involving similar circumstances should also cease for an interim. If necessary, Revenue Canada could obtain waiver in respect of earlier years.

   A test case reasonably representative of the issues should then be heard by the Federal Courts, and the decision of such Court should then be followed. We understand that there are some suitable cases now pending before the Federal Court.

Canada Health Act

On another front, CDA has expressed the concerns of the Dental profession with respect to the Canada Health Act introduced by Monique Bégin. The Canada Health Act, (which was still before a Parliamentary Committee as this article was submitted for publication) as originally drafted, raised several concerns to the Dental profession. These were outlined in a CDA brief to the House of Commons Standing Committee on Health, Welfare and Social Affairs. Dr. Robert Hicks, Dr. William Thompson and Dr. Ralph Crawford appeared before the Parliamentary Committee on February 23,

1984 to identify and explain the specific objections of the Dental profession. It was pointed out that the Canada Health Act's definition of "surgical-dental services" was so broad as to suggest that a number of provincially sponsored denticare plans could be interpreted as falling under the influence of the Act. In addition, a draft set of regulations, read in conjunction with the Act, created the possibility of tremendous unanticipated costs for government and serious complications for the Dental profession.

As a result of CDA's presentation to the Parliamentary Committee, CDA was invited to submit a suggested rewording of a definition of "surgical dental services" and the Association was informed that consideration was being given to dropping the draft regulations altogether.

On-going programs

Such CDA initiatives sometimes are reported in the press so that Dentists know that their Association is acting on their behalf. CDA's regular activities, in contrast, may not attract much attention. The Canadian Dental Association's regular, on-going programs, in addition to financial services for members, include the accreditation of educational programs for the preparation of Dentists and Dental auxiliaries. CDA members who have graduated and entered practice sometimes forget that the fact that they graduated from an accredited program meant that separate certification examinations were not required by the NDEB and that national portability of qualifications is promoted and enhanced. Accreditation of these programs is carried out by teams of dental clinicians and educators and ensures that detailed minimum national standards are met. As might be expected, this is an undertaking that cannot be financed solely by survey fees charged to educational institutions. Some additional support is derived from association revenue – i.e. membership fees.

Your CDA membership similarly helps support the CDA's accreditation of hospital dental services. The increasing involvement of the profession in hospital-based dental clinics has been matched by an accreditation process that has identified desirable standards for such services and verified compliance through on-site surveys. The interests of the Dental profession, in the hospital context, have been supported and promoted by the accreditation process. The resulting benefits, in the long run, accrue to the public through improved patient care, and to the dental profession at large through increasing recognition of a significant and important role for Dentists in the hospital setting.

Yes, CDA continues to carry out some regular programs, such as accreditation, that serve the interests of the dental profession as much as the public. CDA also becomes heavily involved in national issues touching the profession as a whole. It seems to be easier to identify a whole list of CDA programs and initiatives, however, than it is to communicate their significant impact for the dental profession as a whole. If their impact was satisfactorily understood, CDA membership drives would not be required. Every member of the profession would readily recognize that CDA has done and continues to do a tremendous number of things which benefit every member of the profession. Those who are not members of the CDA are benefitting without contributing their share of the necessary support.

For regular updates about CDA activities, be sure to read CDA's "Communiqué" – another regular service to members.

A capsulised overview of the organization and functions of the Canadian Dental Association follows, in the article: "The structure and functions of the CDA."

STRUCTURE AND FUNCTIONS OF THE CDA

A membership organization should function to benefit the greatest number of members possible.

As a national association speaking to over 13,000 dentists, reaching a measurable concensus can only be accomplished in limited areas. In an attempt to discover a dental viewpoint regarding the requirements of the dental community, comment is invited from its members. Such feedback allows CDA council and committee members, and support staff, to be more informed and responsive when addressing dentists' concerns.

The Association has 24 employees and more than 100 volunteers to carry out its activities. The following is a brief description of the role of its Councils and Committees which report to the Board of Governors. The Board of Governors consist of representatives chosen by each provincial association (CDA Corporate members) according to the number of dentists with memberships in both organizations.

Executive Council

- Conducts the business of the Association and establishes interim policies when they are necessary to the management of the Association.
- Establishes administration rules and regulations consistent with the by-laws of the Association.
- Supervises the maintenance of headquarters property.

Committees of the Executive Council

Management Committee

- Serves as custodian of all monies, securities and deeds belonging to the Association.
- Presents the Auditor's report for the preceding year and the proposed Budget for the succeeding fiscal year.

Convention Committee

- In concert with the corporate member in the province where the convention is located, the Committee organizes both the scientific and social programs.

Membership Committee

- Operates to enhance membership in the CDA with particular attention to the voluntary provinces of Ontario and Quebec.
- Conducts a student membership campaign in all provinces except Ontario, where it liaises with the provincial committee.

Product Acceptance Committee

- Evaluates all applications to determine if the CDA Seal of Recognition should be awarded to dental products.
- Reviews all packaging advertising and promotional materials produced by dental products manufacturers in order to maintain the Seal of Recognition.

Committee on Salaried Dentists

- Provides a forum for discussion of common interests and concerns of salaried dentists in Canada.

Taxation Committee

- Identifies areas where federal taxation legislation or regulations are unjust or unfair to individual dentists and/or the public.
- Recommends necessary action to correct the inequities.
- Prepares submissions to governments and activates lobbies when deemed necessary.

Council on Constitution and By-laws

- Reviews the by-laws, letters patent and any supplementary letters patent.
- Recommends amendments and drafts or reviews the text of all proposed amendments.

Council on Dental Materials and Devices

- Acts in an advisory and consultative capacity to evaluate materials and devices employed in the practice of dentistry and the maintenance of oral health.
- Develops standards for materials and devices and encourages a program for testing, evaluation, acceptance and certification.

STRUCTURE OF THE CANADIAN DENTAL ASSOCIATION

BOARD OF GOVERNORS

MANAGEMENT COMMITTEE

EXECUTIVE COUNCIL

EXECUTIVE COMMITTEES

- Convention
- Editorial Board
- Membership
- Product Acceptance
- Salaried Dentists
- Taxation

COUNCILS	SPECIALTY SECTIONS	AFFILIATED SOCIETIES
Constitution & By-laws	Cdn Academy of Endodontics	Assoc. of Cdn. Faculties of Dentistry
Dental Materials & Devices	Cdn. Assoc. of Oral & Maxillofacial Surgeons	Cdn. Dental Assistants' Association
Education a) Undergraduate, Graduate, Postgraduate b) Auxiliaries c) Dental Admissions Test d) Continuing Education	Cdn. Academy of Pathology	Cdn. Dental Hygienists' Association
	Cdn. Academy of Radiology	Cdn. Fund for Dental Education
	Cdn. Association of Orthodontists	National Dental Examining Board
	Cdn. Academy of Paedodontics	Royal College of Dentists of Canada
Ethics		
Health Care a) Comm. on Public Health & Preventive Dentistry b) Dental Programs & Services c) Dental Auxiliaries	Cdn. Academy of Periodontology	Canadian Academy of Prosthodontists
	The Assoc. of Prosthodontists of Canada	Canadian Academy of Restorative Dentistry
	Canadian Society of Public Health Dentists	
Hospital Services		
Information Services		
Insurance & Investment (CDSPI)		
Nominations		
Student Affairs		

• Reviews advertising and/or demonstration of any non-pharmalogical aspects of materials and devices.

Council on Education

• Studies all matters relating to dental education.

• Develops guidelines in respect of matters relating to dental education and evaluates the various forms of dental education

• Accredits undergraduate, postgraduate and graduate programs in dentistry, programs in dental hygiene and dental assisting courses and periodically reviews such accreditation.

• Approves dental internships and residencies when such internships and residencies are components of accreditable postgraduate and graduate programs.

Council on Ethics

• Recommends ethical standards and promotes ethical principles.

• Reviews the CDA Code of Ethics to encourage the highest possible standards of dental practice and to protect the public from improper and unethical practices and treatments.

Council on Health Care

• Formulates guidelines on matters relating to dental health care, dental programs and auxiliary personnel.

• Reviews all methods of reducing oral disease and formulates guidelines for their implementation.

• Develops guidelines for the provision of dental services and studies matters relating to the development and utilization of auxiliary dental personnel.

Council on Hospital Services

• Approves hospital dental services, assists in maintaining a high standard of dental services in Canadian hospitals.

• Examines and reports on the Provincial Acts governing provision of dental services in hospitals.

Council on Information Services

• Develops guidelines for methods and programs to disseminate educational material to the public.

• Develops guidelines for methods and programs to effectively communicate with members of the Association.

Council on Insurance and Investment, (CDSPI)

• Recommends the kinds of insurance and terms of coverage desirable for the membership which can be advantageously purveyed to the membership on a group basis.

• Surveys the insurance market to determine costs, terms and conditions of available coverage and negotiates the costs, terms and conditions of contracts with the chosen carriers.

• Reviews insurance contracts to determine suitability of contracts and possibility of improved terms and to assess proposals of competing carriers.

Council on Nominations

• Prepares a list of all elective offices to be filled, accepts nominations in writing for each vacancy and rules on the eligibility of the nominees.

• Invites further nominations to ensure there is at least one nominee for each vacancy.

Council on Student Affairs

• Recommends on policies bearing on student members' involvement in national and international dental student affairs.

• Accepts responsibility for the effective organization and conduct of the Annual Canadian Dental Students' Conference.

• Reports on students' interests and activities:

N.B.: Specialty Sections are recognized by the Canadian Dental Association and are listed on the following chart, as well as the Affiliated Societies and other dentally related organizations.

Briefly

A dental survey was carried out recently in Labrador to enable the Grenfell Regional Health Services Dental Division to properly plan its programs for the late 1980s and 1990s. The work began in early January, according to James Messer, chief of dental services for the Grenfell organization, because most residents were in their home communities at that time of year. In the summer, he said, they become scattered throughout Labrador.

The team was headed by Dr. Ivan Curson, a former professor of dentistry from London, Ontario, who is dental adviser to the Grenfell Regional Health Services Dental Division. The group also included Dr. Peta Smith, a paedodontist, who primarily investigated the dental needs of school children.

Mr. Messer said the data should enable the health services group to use its manpower more effectively and will provide evidence of areas which require special consideration.

He said an increasing role will be played by preventive dentistry and dental education.

Dental Health Month activities were expanded in Nova Scotia this year. The Nova Scotia Dental Association cooperated with the national campaign in April, but their TV and radio promotions began in February and continued through a three-month period. The Children's Plan was promoted, along with the national "Three-Minute Workout" theme and a locally produced promotion which pointed out that dentists are approachable. On Sunday, April 15, a representative of the NSDA's public relations committee appeared on the CBC children's program "Switchback" when a general discussion of dentistry took place and winners of the provincial poster contest received their prizes on air.

Dalhousie University's School of Hygiene has a new director. Ms. Suzanne Knox assumed that position early in January. She received her Diploma in Dental Hygiene from Algonquin College of Applied Arts and Technology, Ottawa, Ont., and a Master's degree in Education from Lakehead University in Thunder Bay, Ont.

The New Brunswick Dental Society has expressed its concern about that province's health department decision to close fixed dental clinics which provided dental care for school children of the working poor. It was pointed out recently that because of the present depressed economic climate, the working poor in the province are becoming more numerous. The Society fears that that segment of the population will now be forced to neglect their dental health.

The Society has advised the provincial committee on government reform of its concern and will follow this notice with a formal submission.

The Ordre des Dentistes du Québec recently appointed an ad hoc committee to study the impact of aging as it relates to the present and future needs for dental care in the province.

The committee, chaired by Dr. Roland Vallée, consists of Drs. Gerald Houle and Denis Laverdière and Mrs. Therese Varin, a psychologist. The committee was set up to study the changing dental needs of the province's population, as this population grows older.

A questionnaire was sent to all members of the Ordre, asking for input on the needs of the geriatric dental patient in Quebec. The responses to the questionnaires are expected to enable the committee to recommend to Quebec practitioners, various approaches to geriatric dental treatment.

Once the questionnaires are returned, the committee will study the responses and at a later date, report on their findings.

Ontario's Health Ministry recently announced two $28,000 incentive grants to encourage periodontists to practise in northern Ontario communities.

The grants will provide the approved applicants with $7,000 annually for four years, and they are funded through the Ministry's Underserviced Area Program. The purpose of the grants is to make it easier for northern residents to receive periodontal service without having to travel to more southerly regions of the province for treatment.

Ontario's Health Minister Keith Norton said "the Underserviced Area Program has been very successful in getting general dental practitioners to set up their practices in northern Ontario. The Ministry is now seeking to encourage dental specialists to locate in the larger urban centres across the north."

The program was started in 1969 to assist underserviced communities to attract health care professionals. Through the program, there are currently 375 physicians and 90 general practice dentists working in these communities.

Although other dental specialists are also needed in northern Ontario, both the Ontario Dental Association and the Royal College of Dental Surgeons of Ontario agree that the need for periodontists is greatest, because periodontal disease is the primary cause of tooth loss among adults.

Dr. Richard Ten Cate

Dr. A.R. (Richard) Ten Cate, who was recently elected to a second term as Dean at the Faculty of Dentistry, University of Toronto, is the new President of the International Association for Dental Research (IADR).

Dr. Ten Cate was elected at the Association's 62nd General Session which was held in Dallas, Texas, March 15-18, 1984. He is the fifth Canadian to serve as President of the IADR. The others so honored were Drs. Albert Webster, J.B. MacDonald, G. Beagrie (currently Dean at the Faculty of Dentistry, University of British Columbia), and A.H. Melcher.

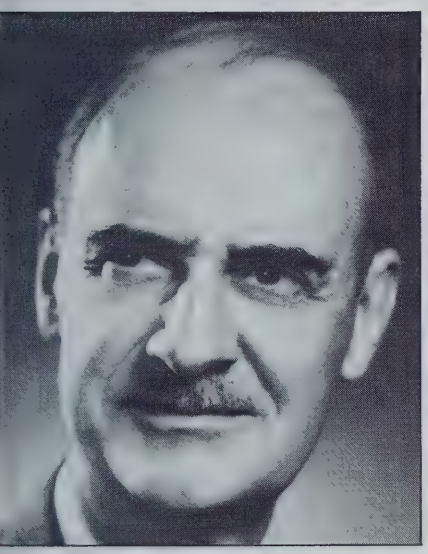
The International Association for Dental Research has more than 6,000 members worldwide.

A Hamilton, Ontario, newspaper recently carried an account about dentists who are now using personal stereos to calm apprehensive patients. Music focuses the patient's emotions on the music rather than

he situation at hand, the writer claimed. The results are a patient who is relaxed and easy to work on. The sound from the head sets transmitted directly to each ear, is much superior to piped-in office music, the writer said. Furthermore, the patients can also select the type of music they enjoy most.

One word of caution was given, however. Tapes should be selected with discretion. For example, it might not be a good idea to provide selections such as Linda Ronstadt's "It Hurts So Bad" or Roberta Flack's "Killing Me Softly."

The article entitled "Periodontics: So What's New?" which appeared in the March 1984 issue of the Journal of the Canadian Dental Association, was written by Dr. Harvey L. **Freedman**, of the Faculty of Dentistry, University of Toronto. Dr. Freedman's name was misspelled in that article, for which the Editors beg "mea culpa."



Dr. Roy G. Ellis

Dr. Roy G. Ellis, a former Dean at the University of Toronto, Faculty of Dentistry, and one of the founders of the current school at 124 Edward Street, in Toronto, will be honored this month.

Dr. Ellis, who was a driving force behind the opening of the Faculty at the Edward Street location, 25 years ago, will be the special guest at a tribute dinner, May 26, at Toronto's Four Seasons Hyatt Hotel.

Born in Peterborough, South Australia, in 1906, Dr. Ellis received his DDS degree from the University of Toronto in 1929. He was Dean at the Faculty from 1947 to 1970, and a member of the Senate of the University from 1938 to 1970. The building at 124 Edward Street, which currently houses the Faculty of Dentistry was built under Dr. Ellis's leadership. The first class graduated from that location in 1960.

This year marks the 25th anniversary of the Faculty at that location, and the tribute dinner to Dr. Ellis will be only part of the celebrations taking place.

For more information about either the dinner or additional anniversary events, contact the University of Toronto, Faculty of Dentistry, 124 Edward St., Toronto, Ont. M5G 1G6.

The Canadian Fund for Dental Education (CFDE) recently received an unrestricted first time cash gift of $10,000 from the Tri-Dont Dental Centres.

The cheque was presented by Dr. Brian Price, who said "our organization is anxious to do its part in financially assisting dental education and research and we have always been impressed by the fine work CFDE is doing in this area for the benefit of the public and the profession.

"This gift is our contribution for 1983 and we hope to do even better in 1984," Dr. Price said.

Evidence of child abuse should be noted and reported when such a patient appears for treatment in dental clinics. Public health dentists in several provinces, including Manitoba and Ontario, have in recent months been advising all dentists and dental teams that about 80 per cent of physical abuse occurs to the head and neck region of the children. Dental teams involved in school based dental programs have been alerted to recognize the evidence and are being advised of the legal obligations of dental professionals to report these findings to law enforcement agencies.

Dr. John Riffel, 72, a retired dentist in Regina, Saskatchewan, has embarked on a second career – as a Roman Catholic priest. He was recently ordained as a deacon in the parish church he and his family have attended for 44 years.

Dr. Riffel, a Life Member of the Canadian Dental Association, is a 1940 graduate of the Faculty of Dentistry, University of Alberta.

Significant awards were recently announced for personnel of the Faculty of Dentistry, University of British Columbia.

Mrs. Bonnie Craig and Ms. Ellen Stradiotti received a grant of $2,500 from Astra Pharmaceuticals Canada Ltd., for an investigation assessing the use of local anaesthesia as a time-saving and therapy-enhancing adjunct to scaling and root planing.

The same pharmaceutical firm awarded a grant of $6,000 to Drs. D. Donaldson, G. Derkson, A. Richardson and Mrs. B.J. Craig to study the clinical effectiveness of Ultracaine DS (carticaine HCL) and Citanest Forte (prilocaine HCL) in Maxillary Infiltration and Mandibular Nerve Blocks.

We should get concerned about brushing our tongues.

A Buffalo, New York, dentist claims that the tongue is a haven for many of the germs that attack the teeth and gums. Alan J. Drinnan of the State University of New York believes North Americans should heed Asian dentists, who are shocked that dentists in the United States and Canada don't instruct patients to clean the organ that provides a staging area for dental disease.

Dr. Drinnan said that for centuries "the Orientals have used tongue scraping as part of their oral health routine." He believes people on this continent should heed this procedure which could "put a dent in oral disease and also freshen their mouths."

CDA Retirement Savings Plan

Unit values of the Canadian Dental Association's Retirement Savings Plan stood as follows on March 31, 1984.

Common Stock Fund	$74.78591
Fixed Income Fund	$37.95126
Guaranteed Fund	$28.14477
Balanced Fund	$15.23445

Total assets (market value) of the plan were $39,281,522.

The previous month's figures, as of February 29, 1984, stood as follows:

Common Stock Fund	$75.48881
Fixed Income Fund	$38.26356
Guaranteed Fund	$27.84827
Balanced Fund	$15.29073

Total assets (market value) of the plan were $38,098,979.

For further information write to: Canadian Dental Service Plans Inc., Ste. 600, 2 Lansing Square, Willowdale, Ontario M2J 4Z3 or call the central information services of CDSPI at 1-800-268-5418 (toll free number for Western Canada, Atlantic Canada and Ontario for Code 807 only, 1-800-268-3411 (toll free number for Quebec and Ontario except Code 807), and 497-7117 (Metro Toronto area).

DON'T JUST THINK ABOUT IT
DO IT!
PARTICIPACTION

Letters

ATTRACTIVE JOURNAL

C.D.H.A. Executive Council has received a copy of the newly designed CDA Journal. We are most impressed with the very attractive graphics and new layout.

On behalf of C.D.H.A., the Executive Council would like to express our congratulations and best wishes for continued success in this fresh endeavor.

Trudy McAvity
C.D.H.A. Secretary

CONGRATULATIONS

I have just received the February issue of the Journal. Congratulations on the improved format and quality of articles. I hope you can maintain this high standard in the future.

J.A. Billett, BSA, DMD
Saskatoon, Sask.

DISAPPOINTING BINDING

One immediate comment on the new format of the Journal of the Canadian Dental Association. The new binding is very disappointing. The loss of a clearly defined spine with the name of the journal, its volume number and date of issue is a backward step. I hope it will be possible to change back to the previous format and, in addition, add the page numbers for each volume.

J.G. Silver, BDS, FRCD(C)
Associate Professor and Head
Department of Oral Medicine
Faculty of Dentistry
University of British Columbia

CLARIFICATION

Thank you for reading our CSDC newsletter (Vol. 6 #1 Nov./83) and sharing our interest in the priority position of children's dentistry. Your news item stated that we felt that Canadian *paedodontists* should consider a campaign similar to that going on in the U.S. I must point out that the main thrust of the article was that in the U.S. the American Academy of Pedodontics and the American Society of Dentistry for Children had formed a *joint* committee. Similarly, we felt that the Canadian Society of Dentistry for Children and the Canadian Academy of Paedodontics would be wise to consider a mutually beneficial and constructive plan of "attack".

As a member of both organizations, and a believer in concerted efforts for the common good, it is important that this emphasis on mutual concern and effective action be clearly understood.

Marvin Klotz
Editor, CSDC (Ontario)
Newsletter

'DURELON CLUB'

I am writing to know if any of your readers have had the unfortunate experience of using Durelon cement prior to the change of formula about 1975. I was told that my case was an isolated incidence, but I already know of two of my colleagues who have had the same experience.

Perhaps a "Durelon Club" could be formed capable of exerting pressure on manufacturers who are not prepared to support their products.

Dr. John G. Cook, DDS
Truro, N.S.

NEW NDHM THEME?

In the News Update section of the February CDA Journal there is an article which states that fitness is stressed during National Dental Health Month.

"Start your day the right way with the 3-minute workout," referring to the proven preventive measures of brushing and flossing. While I have no qualms with the recommendation of this being performed once daily, I believe that the time of day could be more appropriate. As we know, saliva, which provides a protective environment for the teeth against the effects of bacterial acids, is secreted in a significantly reduced volume while we sleep. Hence, the most important time of day to ensure adequate cleaning of the teeth is before retiring.

This point may be particularly important if some people are willing to carry out oral hygiene measures only once a day.

In a profession that stresses precision and accuracy, I believe that we should be equally exact in our advice to patients regarding the care of their teeth.

So how about: "End your day the right way."

John Rogers, DDS
Vancouver, B.C.

'WONDERFUL SERVICE'

I have just noted in your January 1984 issue the publication of Keenan Fong's article "Dentistry's Symbol" on page 19. This article received a third place award in the Bremner competition of last year when I was serving as President of the American Academy of the History of Dentistry. May I take this opportunity of congratulating your Journal on publishing this excellent article, thereby, giving encouragement to dental students to pay as much attention to the written word as to the technical aspects of their education. You have performed a wonderful service for dentistry and on behalf of the American Academy of the History of Dentistry, please accept our sincere appreciation and our commendations.

Clifton O. Dummett, Immediate Past President
American Academy of the History of Dentistry
Professor of Dentistry
Los Angeles, California

TYPOGRAPHICAL ERROR

In my article, "Preservation and fixation of skin for ulterior scientific evaluation and courtroom presentation," in the February 1984, JCDA, Vol. 50, No. 2, a typographical error appears to have occurred.

The article stipulates that the excised specimens are submerged in a 40 per cent solution of formaldehyde. It should read that the specimens are submerged in a **4** per cent solution (**by volume**) of formaldehyde. Also, the word "excision" was incorrectly spelled.

Robert B.J. Dorion, BSc, DDS,
Montréal, Québec.

Resource Centre de documentation

ROOT CANAL THERAPY

One copy of the following articles is available at no charge from the library to all CDA members. Non-members will be charged $5. This bibliography was generated with the help of MEDLARS, a computerized information retrieval system for the Health Sciences field, which has been operational at the library since February 1982, and is at the disposal of all members.

La bibliothèque de l'ADC offre gratuitement à ses membres et pour $5 aux non membres une copie des articles suivants. Cette bibliographie a été préparée avec l'aide de MEDLARS, un système informatisé de recherche bibliographiques pour les sciences de la santé. Ajouté à la bibliothèque en février 1982, ce système est à la disposition de tous les membres.

1. Beck-Mannagetta, J., Necek, D. and Grasserbauer, M. *Solitary aspergillosis of maxillary sinus, a complication of dental treatment (letter)*. Lancet, v. 2, no. 8361, November 26, 1983, p. 1260.
2. Boggia, R. *A single – visit treatment of septic root canals using periapically extruded endomethasone*. British Dental Journal, v. 155, no. 9, November 5, 1983, pp. 300-305.
3. Boksman, L., Jordan, R.E. and Skinner, D.H. *Non-vital bleaching–internal and external*. Australian Dental Journal, v. 28, no. 3, June 1983, pp. 149-152.
4. *British Endodontic Society – guidelines for root canal treatment*. British Dental Journal, v. 155, no. 7, October 8, 1983, pp. 245-246.
5. Cameron, J.A. *The use of ultrasonics in the removal of the smear layer: a scanning electron microscope study*. Journal of Endodontics, v. 9, no. 7, July 1983, pp. 289-292.
6. Cymerman, J.J., Jerome, L.A. and Moodnik, R.M. *A scanning electron microscope study comparing the efficacy of hand instrumentation with ultrasonic instrumentation of the root canal*. Journal of Endodontics, v. 9, no. 8, August 1983, pp. 327-331.
7. Dawe, D.T. *The histopathology of the apical area where conservative endodontic treatment has failed*. Journal of Dentistry, v. 11, no. 3, September 1983, pp. 237-244.
8. Fahid, A. *Coronal root canal preparation*. Dental Student, v. 61, no. 4, January 1983, pp. 46-48.
9. Girsch, W.J., Matteson, S.R. and McKee, M.N. *An evaluation of Kodak Ektaspeed periapical film for use in endodontics*. Journal of Endodontics, v. 9, no. 7, July 1983, pp. 282-288.
10. Harrison, J.W., Gaumgartner, J.C. and Svec, T.A. *Incidence of pain associated with clinical factors during and after root canal therapy. Part 1, Inter-appointment pain*. Journal of Endodontics, v. 9, no. 9, September 1983, pp. 384-387.
11. Holcomb, J.B., Dodds, R.N. and England, M.C. *Endodontic treatment modalities for external root resorption associated with impacted mandibular third molars*. Journal of Endodontics, v. 9, no. 8, August 1983, pp. 335-337.
12. Meeuwissen, R. and Eschen, S. *Twenty years of endodontic treatment*. Journal of Endodontics, v. 9, no. 9, September 1983, pp. 390-393.
13. Newman, J.G., Brantley, W.A. and Gerstein, H. *A study of the cutting efficiency of seven brands of endodontic files in linear motion*. Journal of Endodontics, v. 9, no. 8, August 1983, pp. 316-322.
14. Nosonowitz, D.M. *Flap designs for gaining access to periapical lesions*. Oral Surgery, Oral Medicine, Oral Pathology, v. 56, no. 5, November 1983, pp. 537-541.

Abstract: This article describes the clinical use of the vertical incision and its variations for gaining access to periapical lesions in order to attempt correction of endodontic failures.

15. Pitts, D.L. and Hall, S.H. *Talon-cusp management: orthodontic-endodontic considerations*. ASDC Journal of Dentistry for Children, v. 50, no. 5, September-October 1983, pp. 364-368.
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NEW LIBRARY ACQUISITIONS

TITRES EN BIBLIOTHÈQUE

The following current acquisitions are available on loan from the Resource Centre/Library.

Les titres indiqués ci-dessous sont maintenant disponibles à la bibliothèque/centre de documentation de l'ADC.

1. Albeson, Janet, Paddon, Peter and Strohmenger, Claude. *Perspectives on Health*. Ottawa: Statistics Canada, 1983. 110p. 1 copy.
2. American Dental Association. Council on Prosthetic Services and Dental Laboratory Relations. *Status Report on the Delivery of Prosthetic Care by Nondentists in the U.S. and Canada*. Chicago, Ill.: American Dental Association, 1984, 32p. 1 copy.

Book Reviews

ATLAS OF COMPLETE DENTURES

Gino Passamonti

Quintessence Publishing Co. Inc.
Chicago Ill

Dr. Passamonti correctly states that an atlas allows for a step by step description of the various phases in the construction of complete dentures and, therefore, the reader is referred to appropriate textbooks for an indepth study of the theory.

For any atlas of complete dentures to be effective the sequence of procedures in the construction of complete dentures must be well and clearly illustrated. This atlas does that with over 300 illustrations in color, accompanied by clear explanations which describe the author's techniques.

Chapter 1 illustrates the various dentate conditions that could be relevant to planning for the edentulous state, for example, jaw relationships, tongue position and possible preprosthetic surgery.

The logical progression from the dentate patient is by way of the immediate denture. This is the topic of Chapter 2, in which step by step procedures are clearly outlined and illustrated. Included in this chapter is a "quick glance" chart which lists 19 determining factors to be considered in the selection of posterior denture teeth. It forms an easy reference.

Prior to proceeding to the chapter on the construction of complete dentures Dr. Passamonti demonstrates his appreciation of the practical by pointing out that often patients "wearing old dentures with which he is not satisfied" may be better served by modification of the old dentures. The author's techniques under these circumstances are illustrated with accompanying text.

In Chapter 5 the reader is exposed to a detailed and thorough outline of the clinical and laboratory procedures in complete denture construction. The outline starts with the oral examination, which is somewhat briefly illustrated and ending with the delivery appointment. This is done with 141 large clear illustrations in color. The accompanying descriptions are easy to read and understand and each description is directly opposite each illustration.

The author recognizes the frequent need for dentures to be relined or rebased and so devotes a short chapter to the clinical and laboratory procedures required to carry out this phase of complete denture service.

The chapter on Special Topics is considered to be a valuable and useful one, but, in the opinion of this reviewer might be better placed at the end of the atlas. It illustrates such special topics as metal bases, esthetics, control visits and oral hygiene and appears to interrupt the logical sequence of the atlas.

This atlas by a well known and respected teacher and Prosthodontist is recommended for all dentists and students interested in complete dentures. It is easy to follow. It is complete and thorough. It is well illustrated in color on good quality paper. As an added touch, much like the family Bible, it has a white silk place marker.

This book was reviewed by
W. A. Cotter, D.D.S., M.S.
College of Dentistry
University of Saskatchewan

PREVENTIVE DENTISTRY

PSG Publishing Co. Inc.
292 pgs., $34.50

"Preventive Dentistry" was a delightful book to review, having a wealth of very valuable information on preventive dentistry for today's practicing general dentist, as well as specialists and hygienists. The book appears to be accurate and up to date. It presents its subject matter in a straight forward, uncluttered manner. Several relevant topics are discussed, including the philosophy in one's practice to different age groups. A procedure for a complete oral examination is described, fluoride use is discussed and nutrition counselling and the use of pit and fissure sealants are reviewed. Recall procedures are also discussed in detail.

One of the most interesting sections of the book, for me, was Section III, "Special Programs for Special People". The information found in this section is rarely found in any text. Special preventive techniques are described for the infant to the adolescent. There is a chapter on the pregnant patient with an emphasis on future, family oriented dental care. There are also chapters on preventive dentistry for geriatric and handicapped individuals. The information contained in this section would be invaluable to a practitioner engaged in treating any of these special groups.

The next section deals with preventive dentistry and the community. Community efforts towards fluoridation, caries prevention through education and cancer detection are among the topics presented. The last section presents a specific preventive practice model as well as a discussion of the future of preventive dentistry.

This book was not designed for the dental student, but rather for the practitioner, and to this end, it would be a welcome addition to any dentist's library.

This book was reviewed by
Lynn MacPhee, D.D.S., Cert. Perio.
Halifax, N.S.

TOOTH-COLOURED FILLING MATERIALS IN CLINICAL PRACTICE

Drs. L.W. Deubert and C.B.G. Jenkins

John Wright, PSG Inc.
Littleton, Mass.
146 pp. $16.50

This handbook on tooth coloured filling materials is a very good volume which is part of a series. The authors have made careful mention of this in the preface and stress that some areas of discussion may be rather limited considering that the material may overlap with that discussed in other volumes. This fact may detract from the completeness of this particular volume.

The first edition of the handbook was published in 1972. In the preface to the second edition it is noted that the most outstanding advance in restoration with tooth coloured filling materials is with respect to the introduction of adhesive procedures.

The book is laid out in a very well organized easy to read fashion. It takes us through a discussion of the various materials available, cavity preparations, pulpal considerations, the use of matrices in the restorative techniques, manipulation of the materials, acid etch technique and miscellaneous uses of resins.

The discussion of the various materials is excessive in some instances and falls short in others. The book gives some historical preamble which can be interesting at times and some rather lengthy evaluations of materials which, for the most part, are of

a different era, rather than focussing on the materials currently in popular use. However, the point is made that further development of some of the older materials, considering some of their advantages, still goes on and therefore should not be overlooked.

The presentation of information on materials, structure and specifications is very well done in this book. It is given in a very understandable way and is good in that it allows the general practitioner to make use of this information to help in evaluation of some of the newer products available.

Recent advances in tooth coloured filling materials are touched upon in this volume. It is here, however, that I consider more time may have been spent. Discussion of new light cured resins and techniques for their use I feel is inadequate considering the extent to which they are presently used. As well, not much is said of the microfill resins and the controversy over some of the problems related to them.

The section on the acid etch technique is quite good. It includes some interesting electron micrographs which allow you to see macroscopically what you might otherwise only imagine in your mind's eye. The authors have further related what you see in the electron micrographs to some clinically significant points.

In summary this book is an informative, well written text but does have some shortcomings. General practitioners, however, would find the book to be a good review of the clinical aspects of tooth coloured filling materials.

This book was reviewed by
Dr Murray J.C. White
Winnipeg, Manitoba

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OBITUARIES/NÉCROLOGIES

CLARKE, J.M.: Dr. Clarke, a Life Member of the Canadian Dental Association, was a resident of Belleville, Ontario, at the time of his death. He graduated in 1939 from the University of Toronto.

CLARK, R.H.: A graduate of the University of Alberta in 1961, Dr. Clark also held a periodontics degree from the University of Toronto. Born in Eston, Saskatchewan in 1938, he was a resident and practitioner in Calgary, Alberta, at the time of his death.

CUMMINGS, C.: Dr. Cummings, a well known Ottawa, Ontario, practitioner, was a resident of that city at the time of his death. He was born in 1918 and graduated from the University of Toronto in 1943.

DOLSON, W.J.M.: A graduate of the Royal College of Dental Surgeons of Ontario in 1913, in Toronto, Dr. Dolson was a Life Member of the Canadian Dental Association. He was a resident of Mississauga, Ontario, at the time of his death.

LARSON, J.G.: Born in Vermillion, Alberta in 1937, Dr. Larson graduated from the University of Alberta in 1965. A specialist in periodontics, Dr. Larson was practicing in Edmonton, Alberta, at the time of his death.

MASSICOTTE, C.-E.: Diplômé de l'Université de Montréal en 1921, le Dr Massicotte demeurait à Ste-Foy, Québec, au moment de son décès.

SPENCE, M.: A graduate of the University of Toronto in 1936, Dr. Spence was a Life Member of the Canadian Dental Association. He was born in 1911, and was a resident of Pass Lake, Ontario, at the time of his death.

STEWART, D.L.: Dr. Stewart was a graduate of the University of Alberta in 1958. He was born in 1935.

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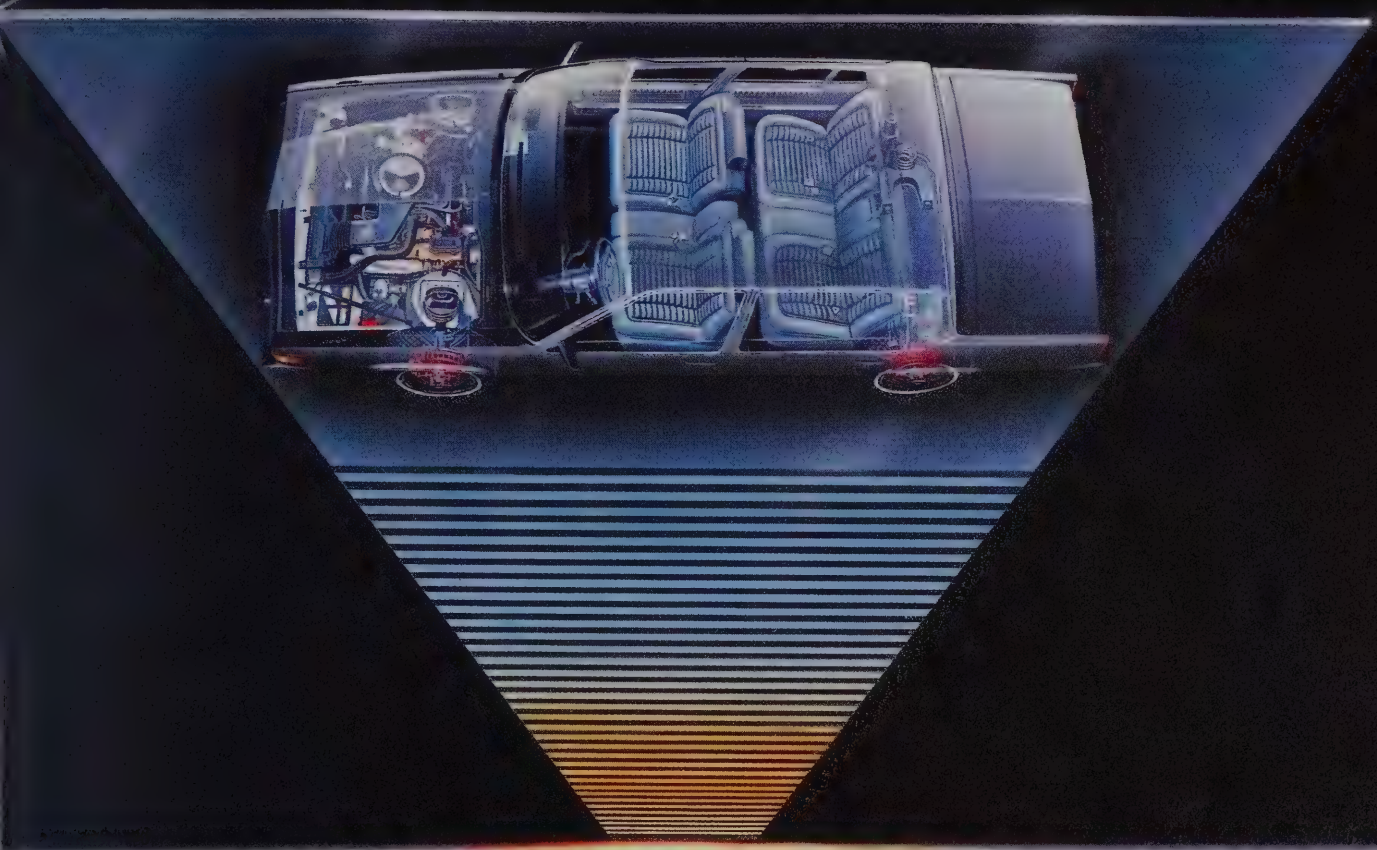

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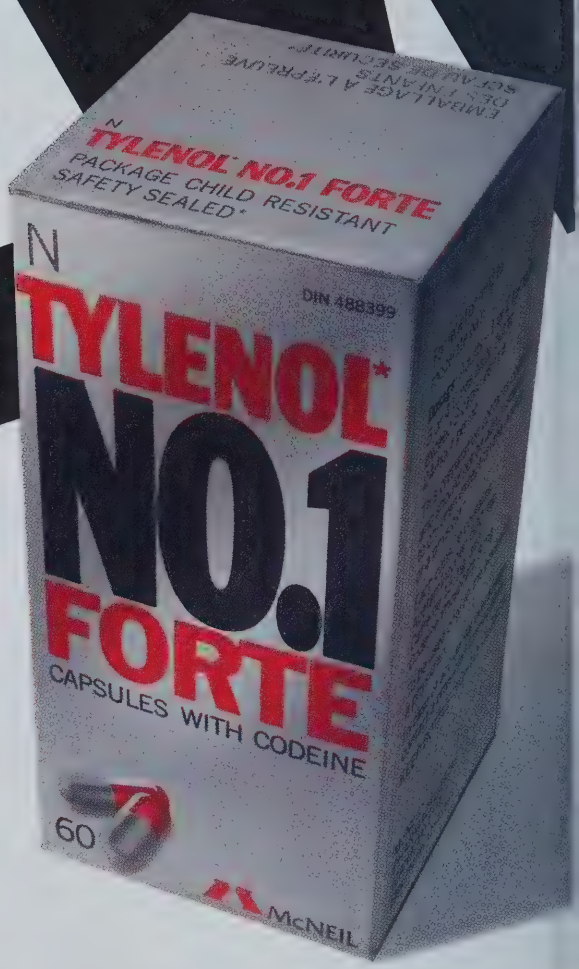

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PAAP

How Colgate's two fluoride formula achieves more complete remineralization resulting in nearly double the cavity protection of a single fluoride formula*.

A major role of fluoride in cavity prevention is to accelerate the process by which demineralized enamel is rebuilt.[1-4] This reverses white spot lesions which would otherwise become cavities.

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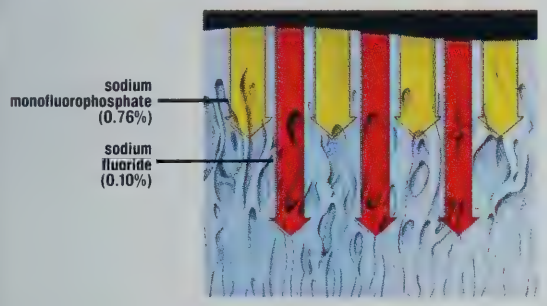
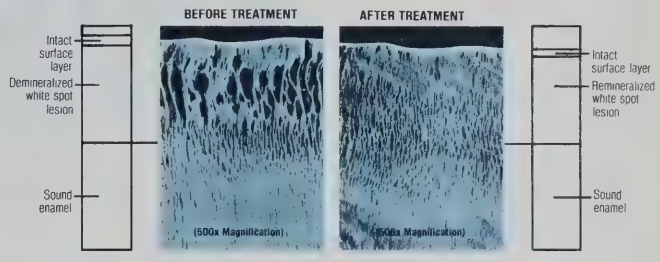
Why these two fluorides remineralize more completely.

It has been postulated that fluorides reach white spot lesions by penetrating enamel through the interprismatic spaces. Sodium monofluorophosphate, being a larger molecule, reacts with enamel primarily at the surface of a white spot lesion. Sodium fluoride, a smaller molecule, penetrates deeper into the lesion.



Working at different levels, the two fluorides may complement each other, enhancing remineralization over a greater area of the lesion than a single fluoride* alone.

This complementary action means more fluoride is available to enhance remineralization over a greater depth of the lesion, than is provided by either fluoride alone.[5,6]



This more complete remineralization has been demonstrated in laboratory studies,[7] and can be seen in the following photomicrographs above.

Clinical studies show nearly double the cavity reduction.

Colgate with this two fluoride concept was tested in a three year clinical study.[8] The results—Colgate's two fluoride formula provided 27.0% reduction in new caries versus 13.8% for the single fluoride positive control* (DMFT).

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†"Colgate Toothpaste contains sodium monofluorophosphate and sodium fluoride which are in our opinion effective decay preventive agents and are of significant value when used in a conscientiously applied program of oral hygiene and regular professional care Canadian Dental Association

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THE CONFESSIONS OF A DENTAL PHOBIC

(Practise what you Preach)

By John Walker*

Going to the dentist terrifies me. The very thought of sharp metal objects scraping and grinding away in my mouth sets my teeth on edge. The sharp sting of the needle pushing through the soft tissue of my gums and the ever-present suction tube slurping up the saliva, bits of teeth reduced to atom-sized particles by the ultrasonic widgets, and high speed torture implements can drive me into panic. It is stress city. I should know, I am a stress management consultant.

At least I know that I am not alone in my terror. There are many of us, "Dental Phobics." Perhaps YOU too, know the cold, wet, chilling fear that goes with the foreboding words, Dental Surgeon. Flashes of blood-letting and medieval dungeons may go through your viscera also.

My fear is no palpable that until recently I hadn't been to a dentist in a decade. Ten long years out in tooth decay no man's land. Fortunately, I have taken good care of my teeth. There is nothing like raw fear to push prevention. My oldest daughter loves her dentist. She's been to see him more in her six years than I in my forty-two. She is so exuberant about going. I could crawl into a dark place with embarrassment when she talks about it.

I really don't know where my irrational fear came from. I suspect my dentist back in Scotland when I was a child had a lot to do with it. He was a large, overbearing man who used a unique anaesthetic. He had a ferocious case of hallitosis. As soon as I was big enough to heft a half brick and strong enough to wrestle my eldest sister to the ground, the dental death sentence was over. I no longer went. Nobody could get me in the door.

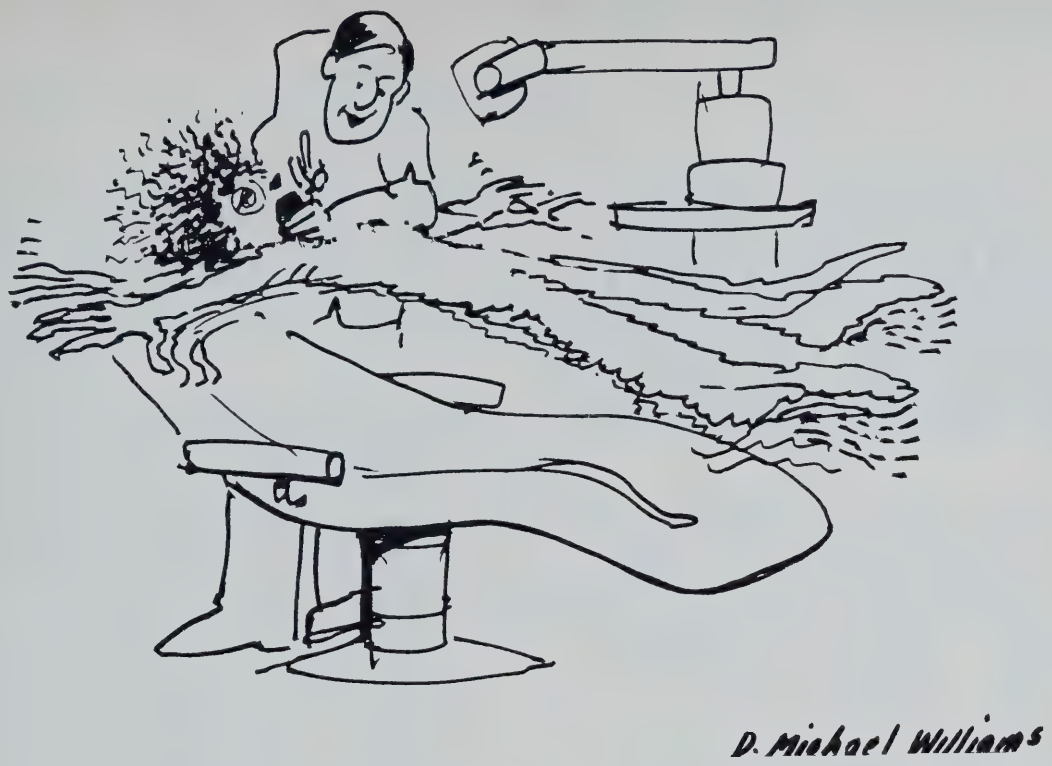
Being a canny Scot, however, overcame the worst of my paranoia . . . no, not paranoia . . . my fear is real . . . of the cold-blooded shrieking kind. My wife's dental coverage was about to end, along with her job. I had to go or in future, I would have to pay if I had to go! There were no excuses left. I had arrived at the bottom line.

Recognizing my fears was the first stage in coping with the problem. Secondly, I knew that I had to teach myself how to relax when in the chair during the dental work itself. This is very difficult when one is rigid with fear while sitting with knees knocking and the viscera in full revolt; sheer panic remains close by.

On the night before my appointment, I went to bed early after a warm bath and a large scotch and did a full relaxation procedure. I then visualized myself going through the whole process in the dentist's chair in a very relaxed state. I played the whole thing over in my mind. I was going to be in total control of my emotions and fears and I was going to be a helpful and relaxed patient. I was not going to whimper, shriek or leap out of the chair at any time.

Once into the office and duly processed by the receptionist, I plugged into my Sony Walkman and, in concert with a tape of seashore sounds and relaxing music, I deep breathed for a full fifteen minutes, and successfully got my stress alarm system under control. Noticing that I was now fifteen minutes past my appointed hour with fate, I assertively asked the receptionist if the dentist could get on with it very quickly as my resolve was beginning to fade. Receptionists have a great system for assertive patients. They usher you into a spare room with the impedimentia of pain laid out in full view and leave you alone for a while. It soon gets your perspective in line.

Actually, my dentist is very gentle and patient. He is also more than willing to accommodate my needs. The last thing he wants is a large 180 lb. man jumping out of the chair. I knew that once I got beyond the NEEDLE I would probably be alright. Just before he started I asked for a short stay of execution and consciously altered my breathing so that the moment the dreaded instrument entered my mouth I inhaled deeply. At exactly the point of contact with the needle, I slowly exhaled and turned up my volume. The injection was over before I knew it and I was now ready for the rest.



"THIS MAY STING A LITTLE"

I required four fillings and a good cleaning. The dentist had carefully outlined that he was going to do half the work on this visit and the rest would take a bit longer next time. NEXT TIME . . . I don't think to this day he realizes what a blubbering jellyfish he had in his chair. I was prepared to suspend disbelief, and go the whole way if I got through this visit in the HERE and NOW.

In fact I had managed to overcome my fear so well with positive mental imagery and deep breathing, the actual job of filling was without incident. On the odd occasion when my old defence system tried to snap me back into total fear, I turned up the volume and sank deeper into the music and the rhythmic deep breathing. It was soon over and other than the general discomfort of having what felt like a scrap-yard in my mouth, complete with a vacuum cleaner going full blast, I was soon up and it was all over.

After thanking him for his gentleness and patience, and making my next appointment without hardly a thought, I found myself in the bright sun outside the dentist's office having successfully gone through the going in.

I felt, after it was all over and I was driving home, that I had grown a great deal. It WAS embarrassing to be a stress consultant and be frightened of dental surgery. In gaining control over this part of my life, I had increased by own self-confidence significantly.

I still don't like going to the dentist, but I'm not waiting another ten years either.

Ten suggestions for overcoming the fear of visiting your dentist.

1. Be assertive. Tell your dentist what your fears are and ask him to explain every step of the procedure.
2. If you are not comfortable with some aspect of the procedure, let him know.
3. Choose a time for your appointment when you are not rushed, hungover or uptight about other issues.
4. Examine your fears carefully and talk them over with a close friend or family member.
5. Write down how you would like to act during the dental procedure.
6. Prepare yourself by getting a good night's sleep before, eat lightly and visualize yourself coming through it successfully.
7. Buy a relaxing tape and practise deep, slow, rhythmic breathing. Take the tape to the surgery and make sure you play it during the procedure.
8. When dwelling on the fear cycle of dental work, imagine a stop sign coming up in your head and switching the fearful images off. Replace them with positive and soothing OK messages.
9. Visit the dental clinic before your appointment and picture yourself successfully having the work done.
10. Once it is over, pat yourself on the back and give yourself a reward.

The cartoon used with this article was drawn by D. Michael Williams, the son of Dr. Charles H. M. Williams (JCDA No. 11, 1983). He is an industrial designer, who spent 10 years in his own firm in Montreal, before moving on to work with Johnson and Johnson designing toys that are safe for children. Mr. Williams is familiar with the dental profession and often consults with practitioners when designing toys which are safe for children.

* John Walker is a private consultant with a practice in Victoria and Vancouver. He works with government, police departments and private businesses. He wrote this article shortly after visiting his dentist, Dr. Ian Langston in January, 1984.

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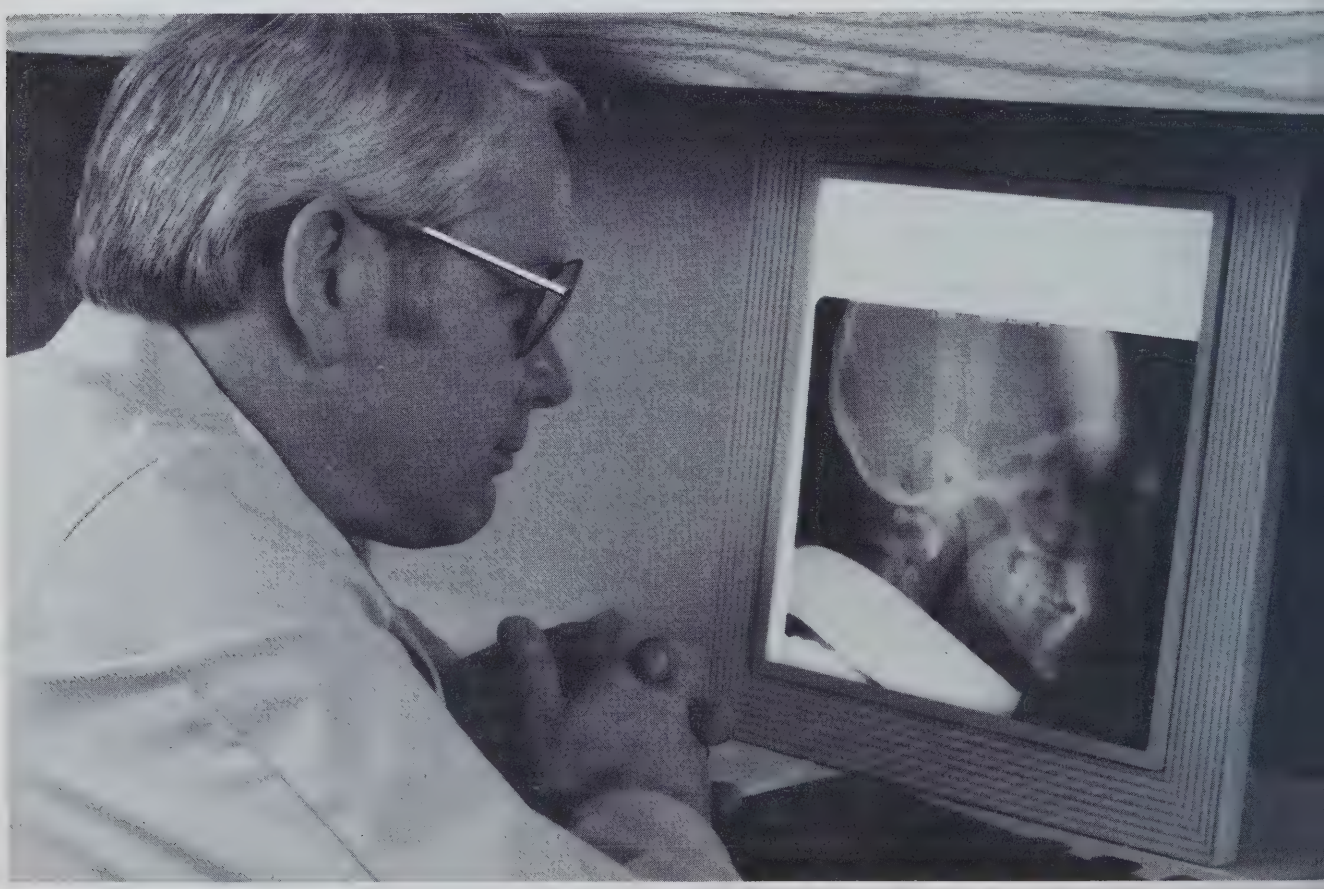

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DESCRIPTION

HEPTAVAX-B* is a non-infectious inactivated subunit viral vaccine derived from surface antigen (HBsAg or Australia antigen) of hepatitis B virus (Dane particles). The antigen is harvested and purified from the plasma of human carriers of hepatitis B virus according to methods developed by Merck Sharp and Dohme Research Laboratories. HEPTAVAX-B* is a sterile suspension for intramuscular injection. Each 1.0 mL dose of vaccine contains 20 μg of hepatitis B surface antigen formulated in an alum (aluminum hydroxide) adjuvant, and thimerosal (mercury derivative) 1:20,000 added as a preservative. The vaccine is prepared without regard to HBsAg subtype. HEPTAVAX-B*, is indicated for immunization of persons at risk of infection from hepatitis B virus including all known subtypes.

INDICATIONS AND USAGE

HEPTAVAX-B* is indicated for immunization against infection caused by hepatitis B virus including all known subtypes. Vaccination is recommended in at-risk persons 3 months of age or older.

The incidence of infection is known to vary greatly in different geographic areas and in different populations throughout the world. Vaccination strategy should vary accordingly.

In Areas with low prevalence: In these areas vaccination may be limited to those who are in groups identified as being at increased risk of infection. The following high-risk categories might be identified in low-prevalence areas:

A. Health Care Personnel
- Dentists and oral surgeons
- Physicians and surgeons
- Nurses
- Paramedical personnel and custodial staff who may be exposed to the virus
- Dental hygienists and dental nurses
- Laboratory personnel handling blood and blood products and other patient samples
- Dental, medical and nursing students

B. Selected Patients and patient Contacts
- Patients and staff in hemodialysis units and hematology/oncology units
- Patients requiring frequent and/or large volume blood transfusions (e.g., persons with hemophilia, thalassemia)
- Clients (residents) and staff of institutions for the mentally handicapped
- Classroom contacts of deinstitutionalized mentally handicapped persons with persistent hepatitis B antigenemia
- Household and other intimate contacts of persons with persistent hepatitis B antigenemia

C. Certain Military Personnel

D. Morticians and Embalmers

E. Blood bank and plasma fractionation workers

F. Persons at Increased Risk of the Disease Due to Their Sexual Practices
such as:
- Persons who repeatedly contract sexually transmitted disease
- Homosexually active males
- Female prostitutes

G. Prisoners

H. Users of Illicit Injectable Drugs

Areas with high prevalence: In these areas, most of the population are at risk of acquiring hepatitis B, often at a young age. Therefore, vaccination should be targeted to young children or to those known to be susceptible.

CONTRAINDICATIONS

Hypersensitivity to any component of the vaccine.

WARNINGS

Persons with immunodeficiency or those receiving immunosuppressive therapy may require larger vaccine doses to develop adequate circulating antibody levels. See **DOSAGE AND ADMINISTRATION** for use in such individuals.

Because of the long incubation period for hepatitis B, it is possible for unrecognized infection to be present at the time HEPTAVAX-B* is given. HEPTAVAX-B* may not prevent hepatitis B in such patients.

Further study is required to determine the effectiveness of HEPTAVAX-B* in preventing hepatitis when the vaccine regimen is begun after an exposure to the hepatitis B virus has already occurred (i.e., use for post-exposure prophylaxis). However, it has been demonstrated that doses up to 3 mL of hepatitis B immune globulin, when administered simultaneously with HEPTAVAX-B* at separate body sites, do not interfere with the induction of neutralizing antibodies against hepatitis B virus.

PRECAUTIONS

General

As with any parenteral vaccine, epinephrine should be available for immediate use should an anaphylactoid reaction occur.

Any serious active infection is reason for delaying use of HEPTAVAX-B* except when, in the opinion of the physician, withholding the agent entails a greater risk.

Caution and appropriate care should be exercised in administering HEPTAVAX-B* to individuals with severely compromised cardiopulmonary status or to others in whom a febrile or systemic reaction could pose a significant risk.

Pregnancy

Animal reproduction studies have not been conducted with HEPTAVAX-B*. It is also not known whether HEPTAVAX-B* can cause fetal harm when administered to a pregnant woman or can affect reproductive capacity. HEPTAVAX-B* is not recommended for use in pregnant women.

Nursing Mothers

It is not known whether HEPTAVAX-B* is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when HEPTAVAX-B* is administered to a nursing woman.

Pediatric Use

Safety and effectiveness in children below the age of 3 months have not been established to date. Use of this vaccine in children below the age of 3 months is not presently recommended.

ADVERSE REACTIONS

In studies involving over 1000 adult volunteers approximately 25% reported some local or systemic complaint. The most commonly occurring side effects of vaccination are local soreness and erythema at the injection site. Local swelling, warmth, or induration is reported less frequently. These signs and symptoms of local inflammation are generally well tolerated and usually subside within two days of vaccination.

Lower grade fever [less than 38.3°C (101°F)] occurs occasionally and is usually confined to the 48-hour period following vaccination. Although uncommon, fever over 39°C (102°F) has been reported.

Systemic complaints including malaise, fatigue, headache, nausea, myalgia, and arthralgia are infrequent and have been limited to the first few days following vaccination. Rash has been reported rarely.

In a double-blind, placebo-controlled study conducted in a high risk population, the overall incidence of side effects among vaccine recipients (24.3%) did not differ significantly from the rate among placebo recipients (21.4%).

DOSAGE AND ADMINISTRATION FOR INTRAMUSCULAR USE ONLY

Do not inject intravenously, subcutaneously or intradermally.
Shake well before withdrawal and use.

Thorough agitation at the time of administration is necessary to maintain suspension of the vaccine. Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration. After thorough agitation, HEPTAVAX-B* is a slightly opaque, white suspension.

The immunization regimen consists of 3 doses of vaccine given ***intramuscularly:***

1st dose: at elected date
2nd dose: 1 month later
3rd dose (booster): 6 months after the first dose

The volume of vaccine to be given on each occasion is as follows:

Group	Initial	1 month	6 months
Younger children (3 months to 10 years of age)	0.5 mL	0.5 mL	0.5 mL
Adults and Older children	1.0 mL	1.0 mL	1.0 mL
Dialysis Patients and immunocompromised patients	2.0 mL*	2.0 mL*	2.0 mL*

**Two x 1.0 mL doses given in different sites*

Revaccination (Booster)

Although the duration of protective effect of HEPTAVAX-B* is unknown at present, available data suggest that immunity will last for about 5 years in patients who have received all three doses, after which time a single booster dose of vaccine might be necessary to maintain immunity. Booster doses thereafter might be given every 5 years.

Store unopened and opened vials at 2 - 8°C (35.6-46.4°F). **Do not freeze.** The vaccine is used directly as supplied. No dilution or reconstitution is necessary. Thimerosal in 1:20,000 dilution is present in the vaccine as a preservative. Do not use vaccine after the expiration date.

It is important to use a separate sterile syringe and needle for each individual patient to prevent transmission of hepatitis and other infectious agents from one person to another.

For Syringe Use Only: Withdraw the recommended dose from the vial using a sterile needle and syringe free of preservatives, antiseptics, and detergents.

AVAILABILITY

No. 4720 Ca — HEPTAVAX-B* contains one 3.0 mL vial of liquid vaccine. For use with syringe only.

FULL PRODUCT MONOGRAPH AVAILABLE ON REQUEST.

PAAB

MSD
MERCK SHARP & DOHME
CANADA

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EXPENDITURES ON DENTAL SERVICES IN CANADA, CANADIAN PROVINCES AND TERRITORIES 1960-1980

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ABSTRACT

An examination of published and other documents was conducted to outline the level of direct expenditures on dental care services in Canada and Canadian provinces from 1960-1980. Per capita expenditures increased by a factor of 8.7 – from $6.12 to $53.51, and when the effects of inflation were removed the increase was three times. Dental expenditures in 1980 were seen to have increased to 0.44 per cent of the GNP and 5.8 per cent of total expenditures on health care but stood at 47.4 per cent of out-of-pocket expenditures on health care. In 1980, per capita expenditures were highest in British Columbia at $85.75 and lowest in Newfoundland at $19.40.

Public expenditures on dental care increased by a factor of 129 times, to amount to 13.7 per cent of the 1980 totals; up from 1.2 per cent in 1960. The share of the nation's dental expenditures improved in four of the six provinces with publicly-funded children's dental programs.

SOMMAIRE

Afin de déterminer le coût des soins dentaires au Canada et dans chaque province de 1960 à 1980, on a procédé à une étude des textes publiés et autres. Le coût per capita s'est accru considérablement, passant de 6,12$ à 53,51$, et si l'on fait abstraction de l'inflation, on découvre que le coût a triplé. En 1980, le coût des soins dentaires a augmenté pour constituer 0,44 pour cent du PNB et 5,8 pour cent du coût global des soins de santé, mais il s'est maintenu pour constituer encore 47,4 pour cent des frais et débours divers en soins de santé. La même année, le coût le plus élevé per capita était 85,75$ en Colombie-Britannique et le plus bas, 19,40$ à Terre-Neuve.

Les dépenses publiques pour les soins de santé sont passées de 1,2 pour cent en 1960 à 13,7 pour cent en 1980, soit un coefficient de 129. La part nationale des coûts dentaires a augmenté dans quatre des six provinces ayant des régimes d'assurance dentaire publics pour les enfants.

INTRODUCTION

Dental care has an important position in Canada's health care system. An understanding of expenditures on dental care relative to national economic indicators and among the provinces is critical to the profession and those who study health care policy. Accordingly, this paper sets out to document the expenditures on dental care, compare them both to national economic indicators and within the provinces and to discuss some of the changes that have occurred in the two decades, 1960-1980.

DATA SOURCES

The paper uses data available from the public records, mainly from publications and reports made available by the Department of National Health and Welfare, Policy, Planning and Information Branch, Information Systems Directorate, Health Information Division.[1-4] A second major source is the data gathered periodically by Statistics Canada (formerly the Dominion Bureau of Statistics) for the purpose of compiling the basket of goods and services on which the Consumer Price Index (CPI) is calculated.[5] There are, however, important differences in these two data sets.

A. Health and Welfare Data

The Department of National Health and Welfare data are derived from income tax returns filed by taxpayers identified as dentists, as supplied in summary form by the Taxation Division, Department of National Revenue. Expenditures on dental care are calculated by Health and Welfare from th adjusted total gross practice earnings c taxpayers whose major source of income i private dental practice. Adjustments ar necessary to account for under-reporting resulting from both late returns and th absence of reports of earnings of dentist whose major source of income was receive from sources other than private dental prac tice. In 1968, for example, the adjustmer procedures resulted in the expenditure est mates being based on the gross practic earnings of 6,259 dentists – 93 per cer of the active dentists in Canada.[1]

In more recent years, the provinces c Prince Edward Island, Saskatchewan an Manitoba and areas of federal responsibil ity in the Provinces and Territories, hav operated direct service programs whic employ both dentists and dental auxiliarie on salary. These expenditures would not b captured through the tax returns as thes people would be classified as employees. T compensate for this, the costs of these pro grams for all items other than administra tion, are added by the Department to th total gross earnings of private practi tioners.[6]

Omitted from these estimates are expend itures for local dental public health activities which often consist of community preven tive education and topical fluoride pro grams. In some urban centres, such a Vancouver, Calgary, Winnipeg an Toronto, such local programs also provid treatment services, which are usuall limited to school children. The omission c the cost of these programs may not alter th estimates significantly. For example, i Ontario during 1979-80, these program cost $7.5[7] million (88¢ per capita). Thi results in an increase of 1.7 per cent in th 1979 Ontario estimate.

A second omission is the expenditures o dental services provided by dental intern

and residents in hospitals. These are not separately identified but are included in hospital costs. While no data exist for Canada, Scitovsky[8] estimates that in the United States in 1978, these costs would have added $0.2 billion to the $11.9 billion estimated from dentists' income data. Thus, in the United States, inclusion of these costs would add a further 1.7 per cent to the national dental expenditures. In Canada, a further estimate should be made for that part of hospital and medical care costs incidental to oral surgery provided by private dentists under the various provincial medical care programs. No published data exist which estimate these costs.

The third omission is the expenditures made directly to denture therapists who, during the period under study, gained legal status in many Canadian jurisdictions. Since they are not an occupation group identified separately by Revenue Canada, their gross practice earnings are not available for inclusion in the total expenditure estimates.

B. Statistics Canada Data

The second data set is derived from surveys of families, which are conducted to determine what items people purchase and the amounts spent on these items over a one-year period. The survey uses a standardized survey protocol, trained interviewers, and is conducted at regular intervals. Since the sampling methods changed in different years, the data must be used with caution in interpreting trends. The results published as Urban Family Expenditures for the years 1959 to 1978 were used for this study.

Out-of-pocket expenditure data have the advantage of being published according to family size, family income and region of residence. These data both include and separately identify the out-of-pocket expenditures made to denture therapists. In 1976, for example, families spent an average of $3.40 on dentures and repairs from denture therapists out of a total average expenditure for dental care of $113.60.[9] Thus the expenditure on denture therapists added 3.0 per cent to the expenditures on dentists' services.

However, the major limitation to the Statistics Canada data is that they pertain only to out-of-pocket expenditures. Thus they do not include the share of total costs on dental care paid by third-party insurers or social security programs.

Neither of the two data sets includes other direct and indirect costs of obtaining dental care. Other direct costs would be the costs to the patient of travel to and from the dentist. Indirect costs are those of lost productivity in employment or housekeeping while travelling to, waiting for or obtaining dental care. Psychosocial costs of pain or infection caused by not obtaining care are also not included.

FINDINGS

Table I shows the relative size of family dental expenditures derived from the Statistics Canada surveys of urban family expenditures. The data show dental expenditures for families of two or more, as they were consistently identified for all five surveys. Between 1959 and 1978, such families increased their spending on dental care, on average, from $31.80 to $131.60 – a factor of 4.1 times. Over the same period, the percentage of families with dental expenditures was observed to be 56.4 per cent in 1959; rose to 65.3 per cent in 1969 and fell to 59.1 per cent in 1978. This level of utilization seems low, especially in the latter decade, given that it includes two or more people.

The major finding shown in **Table I** is that out-of-pocket dental expenditures, as a percentage of current consumption, appear to have peaked somewhere about the 1969 period; current consumption is defined as total family expenditures less expenses for personal taxes, gifts and security. In 1959, expenditures on dental care were 0.67 per cent of current consumption, rose to 0.96 per cent in 1969, and fell through 0.86 per cent in 1974 to 0.77 per cent in 1978.

The level of dental expenditures is also compared to the total direct out-of-pocket health care costs, i.e., direct family costs minus premiums paid for health insurance. As can be seen, for urban families, dental care costs were continuing to increase – from 14.6 per cent in 1959 to 46.8 per cent of direct costs by 1974. Between 1974 and 1978, the rate of increase was slowing and by 1978 dental care costs were 47.4 per cent of all direct health costs. Thus, since 1969, direct expenditures on dental care have fallen relative to current consumption but have increased relative to other direct costs for health care.

Table II shows the aggregate expenditures for dentists' services in Canada derived from the tax returns of dentists for five selected years over the 1960-1980 period. The data show the aggregate amount spent on dentists' services and that amount as a percentage of three national economic parameters, namely, the total production of goods and services as measured by the Gross National Product (GNP), aggregate personal income and total expenditures on health care. As can be seen, the amount spent on dental care in 1980 approached $1.3 billion and that level was nearly 12 times the 1960 expenditure. Comparing these amounts to other national economic indicators shows that expenditures have increased as a percentage of the GNP from

TABLE I

Expenditures on Dental Care by Families of Two or More in Urban Centres, Canada, Selected Years, 1959-1978

	1959	1964	1969	1974	1978
Survey conducted in	**Centres with population of 15,000+**	**11 cities**	**11 cities**	**11 cities**	**16 cities**
Current consumption in year by family ($)	4,751	5,864	7,274	11,590	17,036
Average expenditure on dental care ($)	31.80	46.80	70.20	100.20	131.60
as a proportion of:					
– direct (out-of-pocket) expenses on health care (%)	14.6	19.8	32.3	46.8	47.4
– current consumption (%)	0.67	0.80	0.96	0.86	0.77
Percent of families reporting expenditures (%)	56.4	57.0	65.3	61.6	59.1

Source: Urban Family Expenditures, Statistics Canada (various years).

TABLE II

Level of Expenditures on Dentists' Services in Canada Compared to Economic Indicators – Selected Years 1960-1980

	Expenditures				
	1960	1965	1970	1975	1980
Amounts $ (000's)	109,644	160,062	265,021	596,603	1,288,042
Percent of:					
1) GNP	0.29	0.29	0.31	0.36	0.44
ii) Personal income	0.37	0.39	0.40	0.44	0.54
iii) Total health expenditures	5.1	4.8	4.2	4.8	5.8

Note: Preliminary estimates for 1981 place dentists' expenditures at $1,482.9 million.
Sources: Department of National Health & Welfare. Statistics Canada.

TABLE III

Per Capita Expenditures on Dentists' Services by Canadian Provinces, Canada and U.S.A. for 1960, 1965, 1970, 1975 and 1980

	Dollars				
Province	1960	1965	1970	1975	1980
Newfoundland	1.71	2.39	4.11	8.99	19.40
Prince Edward Island	3.81	4.80	6.79	22.55	36.84
Nova Scotia	3.27	4.89	7.73	17.93	36.82
New Brunswick	3.26	4.54	6.47	12.61	28.34
Quebec	4.02	5.26	7.96	16.54	38.71
Ontario	8.09	10.97	16.28	31.02	61.03
Manitoba	6.18	7.53	11.93	24.40	52.02
Saskatchewan	4.94	6.07	9.01	20.64	48.91
Alberta	6.79	9.04	13.86	32.23	55.77
British Columbia	9.32	11.66	17.95	44.34	85.75
Territories	0.45	2.61	6.67	11.91	24.07
Canada	6.12	8.13	12.43	26.25	53.51
U.S.A.	10.98	14.51	22.52	37.29	68.42
Canada (1960 dollars)	6.12	7.51	9.50	14.09	18.89

Notes: 1) Preliminary estimates for 1981 place per capita expenditures at $60.86 or $19.10 in 1960 dollars.
2) Current expenditures deflated by the Consumer Price Index – all items yearly average.

Sources: Department of National Health and Welfare, Gibson, R.M. and Waldo, D.M. and Statistics Canada.

0.29 per cent to 0.44 per cent – an increase of 52 per cent over the 20 years. The industry has also grown by 46 per cent when measured against national personal income – from 0.37 per cent in 1960 to 0.54 per cent in 1980.

When examining dental expenditures as part of total expenditures on health care, it must be remembered that these years encompass the period during which total expenditures on health care were increasing as a result of the introduction of the national programs for hospital insurance, in 1957, and medical care, in 1968. In 1960, for example, total expenditures on health care represented 5.6 per cent of the GNP, and by 1971 had reached 7.5 per cent.[2] The decrease in dental expenditures as a share of total health expenditures – from 5.1 per cent in 1960 to 4.4 per cent in 1970 – represents the more gradual expansion of dental expenditures during the period of rapidly expanding spending on hospital and physicians' services which were mandated by legislation and subsidized by transfer payments from the federal and provincial governments. However, after 1970, dental expenditures increased more rapidly than other components of health care, and by 1980 represented 5.8 per cent of the total.

Table III provides the per capita expenditures on dentists' services in each of the Canadian provinces and across Canada and in the United States. In addition, the Canadian average is shown in constant 1960 dollars (deflated by the CPI) in order to remove the effect of inflation. Ignoring differences in currency exchange rates, Canadians spent less than Americans in every year. Nevertheless, as measured in current dollars, spending by Canadians increased from $6.12 in 1960 to $53.51 in 1980. In constant (1960) dollars, per capita spending had tripled – increasing from $6.12 to $18.89.

Table III also shows the variation in per capita expenditures by province. Expenditures in British Columbia were highest in each of the five selected years during the 20-year period. The level of expenditures in British Columbia is followed generally by Ontario, Alberta and Manitoba. In 1980, for example, expenditures were $85.75 in British Columbia, $61.03 in Ontario and $55.77 in Alberta. The other provinces consistently had expenditures below the national average, with the 1980 level of provincial expenditures declining in order from Manitoba to Saskatchewan, Quebec, Prince Edward Island, Nova Scotia, New Brunswick and Newfoundland. Expenditures in the Northwest Territories in 1960 of 45 cents were minimal, but the data were based on the tax returns of very few dentists and appear to be understated. How-

ever, since 1965, per capita expenditures in the Territories have ranked ahead of Newfoundland.

It is obvious that per capita spending has increased at different rates in different provinces. This is demonstrated in **Table IV**, which provides the rate of increase in per capita spending on dentists' services by province, calculated from the data in **Table III**. Nationally, per capita spending over the 20 years, 1960-1980, has increased by a factor of 8.74. This is greater than the rate of 6.23 observed in the United States. Expenditures in six provinces: Newfoundland, P.E.I., Nova Scotia, Quebec, Saskatchewan and British Columbia, exceeded the national rate. The lowest rate of increase over the 20-year period was observed in Ontario.

A second observation from **Table IV** is the period during which the rate of increase was greatest. Nationally, the highest rate of increase occurred during the 1970-1975 period. This coincided with the experience in five provinces. In the other provinces, the Territories and the United States, the highest annual rate of increase in per capita expenditures came during the period 1975-1980.

The sources of increased expenditures on dentists' services are shown in **Table V**. These are identified by public funds, i.e., those spent by governments at the federal, provincial and municipal levels and by private funds, whether they be "out-of-pocket" or paid by private dental insurance. As discussed earlier, the costs of direct service programs, such as in Saskatchewan, Manitoba and Prince Edward Island, are included in the public expenditures. Also included are the public funds used to pay claims for beneficiaries eligible under the various specific dental insurance programs such as in Quebec and Nova Scotia. Included also are the public expenditures related to dental care for public assistance recipients, injured workers (compensation), war veterans and native peoples.

It is obvious from the data in **Table VI** that the period 1970-1980 was a period of increasing demand for dentists' services in Canada, with this rate of increase being dramatically higher than in the previous decade.

Canadian expenditures on dentists' services over the 20 years have increased by a factor of 11.7 when compared to 1960 levels. Public expenditures have increased by 129.2 times – from $1,365,000 in 1960 to $176,344,000 in 1980. Nationally, private expenditures have increased approximately 10 times. However, they have declined as a percentage of total expenditures – from 98.8 per cent in 1960 to 86.3 per cent in 1980.

Total expenditures on dentists' services have increased most dramatically in British Columbia, having risen by approximately 15 times. Manitoba, New Brunswick, Saskatchewan and Ontario had the lowest rate of increase, with 1980 levels being less than 11 times the 1960 levels.

While the 1960 P.E.I. data may be incomplete, public expenditures appear to have increased by the greatest ratio in this province – 786 times the 1960 amount. Other provinces in which the rate of increase of public expenditures exceeded the national rate were Quebec (440 × 1960 levels) and Saskatchewan (193 × 1960 levels). It is interesting to note that these provinces introduced publicly-funded provincial children's dental care programs during this period. Public funding increased at a rate lower than the national trend, in descending order, from British Columbia to Alberta, New Brunswick, Nova Scotia, Newfoundland, Manitoba and Ontario. Newfoundland, Manitoba and Nova Scotia had introduced publicly-funded children's dental programs, and Alberta had introduced its programs for children with cleft-palate and for senior citizens.

Private funds spent on dentists' services in 1978 increased most in British Columbia (14 × 1960 levels) and Alberta (12 × 1960 levels). Private funding increased at about the national rate (10 × 1960 levels) in Nova Scotia and Ontario and slower than the national rate in the other provinces.

The proportion of dentists' services paid by the public sector increased significantly over the 1960-1980 period in all provinces. While not shown in **Table V**, the data show that the 1980 public expenditures, as a percentage of the total expenditures on dental care, were 49 per cent in Newfoundland, 40 per cent in Quebec, 35 per cent in P.E.I., 25 per cent in Nova Scotia and Saskatchewan, 11 per cent in New Brunswick, 10 per cent in Manitoba, 9 per cent in Alberta, 6 per cent in British Columbia and 3 per cent in Ontario.

While it is not the purpose of this paper to account for the differences among provinces in levels of public participation in the purchase of dentists' services, there are obvious differences between the two provinces at the extreme which may lie behind these data. In Ontario there is no publicly-

TABLE IV

Rates of Increase in Per Capita Expenditures on Dentists' Services in Canada, Canadian Provinces and U.S.A. over Intervals Ending in 1965, 1970, 1975 and 1980

	Rate of Increase				
Province	1965 / 1960	1970 / 1965	1975 / 1970	1980 / 1975	1980 / 1960
Newfoundland	1.40	1.72	2.19*	2.16	11.35
Prince Edward Island	1.26	1.41	3.32*	1.63	9.67
Nova Scotia	1.50	1.58	2.32*	2.05	11.26
New Brunswick	1.39	1.43	1.95	2.25*	8.69
Quebec	1.31	1.51	2.08	2.34*	9.63
Ontario	1.36	1.48	1.91	1.97*	7.54
Manitoba	1.22	1.58	2.05	2.13*	8.42
Saskatchewan	1.23	1.48	2.29	2.37*	9.90
Alberta	1.33	1.53	2.33*	1.73	8.21
British Columbia	1.25	1.54	2.47*	1.93	9.20
Territories	n.a.	2.56	1.79	2.02*	n.a.
Canada	1.33	1.53	2.11*	2.04	8.74
U.S.A.	1.32	1.55	1.66	1.83*	6.23

n.a. – not applicable.
*Interval with greatest rate of increase.
Source: Table III.

TABLE V

Expenditures by Public and Private Sectors on Dentists' Services by Province for 1960, 1965, 1970, 1975 and 1980

Province	1960 $000's	1965 $000's	1970 $000's	1975 $000's	1980 $000's	Ratio 1980 1960
Newfoundland						
Public	97	137	539	2,507	5,401	55.7
Private	669	1,027	1,589	2,438	5,579	8.3
Total	766	1,164	2,128	4,945	10,980	14.3
Prince Edward Island						
Public	2	5	186	785	1,572	786.0
Private	390	518	563	1,862	2,956	7.6
Total	392	523	749	2,647	4,528	11.6
Nova Scotia						
Public	95	136	535	3,343	7,925	83.4
Private	2,284	3,561	5,516	11,363	23,205	10.2
Total	2,379	3,697	6,051	14,706	31,130	13.1
New Brunswick						
Public	24	45	675	1,429	2,117	88.2
Private	1,897	2,747	3,389	6,975	17,597	9.3
Total	1,921	2,792	4,064	8,404	19,714	10.2
Quebec						
Public	224	396	175	16,641	98,648	440.4
Private	20,499	29,545	47,735	85,627	148,801	7.3
Total	20,723	29,941	47,910	102,268	247,449	11.9
Ontario						
Public	475	715	7,015	12,429	16,564	34.9
Private	49,085	73,933	116,138	241,401	506,773	10.3
Total	49,560	74,648	123,153	253,830	523,337	10.6
Manitoba						
Public	111	161	1,023	2,331	5,586	50.3
Private	5,497	7,108	10,698	22,434	47,735	8.7
Total	5,608	7,269	11,721	24,765	53,321	9.5
Saskatchewan						
Public	62	74	1,111	3,902	11,961	192.9
Private	4,461	5,694	7,363	14,858	35,002	7.8
Total	4,523	5,768	8,474	18,760	46,963	10.4
Alberta						
Public	110	150	369	6,376	10,740	97.6
Private	8,695	12,967	21,762	51,078	109,119	12.5
Total	8,805	13,117	22,131	57,454	119,859	13.6
British Columbia						
Public	149	206	2,916	6,222	14,705	98.7
Private	14,802	20,827	35,391	101,855	214,441	14.5
Total	14,951	21,033	38,307	108,077	229,146	15.3
Territories						
Public	16	110	73	165	1,125	n.a.
Private	0	0	260	582	490	n.a.
Total	16	110	333	747	1,615	n.a.
Canada						
Public	1,365	2,135	14,617	56,120	176,344	129.2
Private	108,279	157,927	250,404	540,483	1,111,698	10.3
Total	109,644	160,062	265,021	596,603	1,288,042	11.7

n.a. – not applicable.
Sources: Department of National Health and Welfare.

funded universal dental program for any age group and there has been a relatively low level of unemployment. Thus, expenditures for children, the aged or public-assistance recipients could be expected to be low. On the other hand, Newfoundland, in 1980 had both a mature children's dental program and a history of persistently high unemployment. These two factors require significant public expenditures on behalf of children and public-assistance recipients.

Table IV sets out information which shows whether the increased funding of dentists' services by governments had any effect on narrowing the discrepancy in expenditures between the provinces. The table gives data for the two end-points – the years 1960 and 1980. The percentage of Canada's population and expenditures on dental services are shown for each province and region of Canada. An equitable distribution by province of expenditures on dental care would result if a province had an expenditure that closely matched its share of the population, as, for example, Manitoba in 1960 with 5.1 per cent of the population and 5.1 per cent of the nation's dental expenditures.

An index of change over the 20 years is also shown. A value of 1.0 means the 1980 expenditures in a province did not change relative to their 1960 position when population numbers were considered. A value greater than 1.0 shows the provincial population increased their share of the nation's expenditures on dentists' services.

The data show that, by and large, when the provinces are used as the unit of analysis there had been little redistribution of expenditures on dentists' services over the 20 years. The provinces of Newfoundland and Nova Scotia gained considerably but the Maritime region remained with 9.3 per cent of the population and only 5.2 per cent of the expenditures. Quebec gained slightly but, as of 1980, still had more than one-quarter of the population and less than one-fifth of the expenditures. Ontario lost ground from its 1960 leading position but its residents still enjoyed considerably more of dentists' services than their share of the population would warrant. The prairie provinces have maintained their share, with just over 17 per cent of both population and expenditures. British Columbia, which entered the period with 8.9 per cent of the population and 13.6 per cent of the nation's expenditures, continued to lead as its residents spent 17.8 per cent of the nation's total while representing 11.1 per cent of the population.

DISCUSSION

The increase in expenditures on dental care has been documented in this study.

While the study does not attempt to account for this increase, some factors are obvious. One factor would appear to be the increasing affluence of Canadians over the 20-year period. Personal per capita income increased from $1,656 in 1960 to $9,971 in 1980.[10] Real incomes thus have doubled over these 20 years, using the Consumer Price Index as the deflator.[11,12] A 1978 study by researchers for the Rand Corporation[13] estimated that for every 1 per cent increase in income, expenditures on dental services by United States' families increased by 0.55 per cent – 0.61 per cent for adults and by 0.87 per cent for children. For families with higher than average incomes, expenditures on dental services were proportionately higher than were the income differences. Given the similarity of the two nations' cultures, it is safe to assume this tendency has held for Canadians, and dental care has attracted an increasing proportion of gains in income.

The slowing of increases in direct dental expenditures as a percentage of direct health care expenditures and their decline as a percentage of current consumption is coincident and consistent with the increasing number of Canadians having dental insurance.[14] The effect has been to reduce out-of-pocket expenditures even though total expenditures are increasing.

A third factor in increasing dental expenditures is the improved availability of dental services. The number of dentists increased from about 5,830 in 1960[15,16] to 11,095 in 1980.[17] The number of dental hygienists increased from 476 in 1967 to 3,924 in 1980.[17] Legally practising denture therapists increased from none in 1960 to 1,526 in 1980.[18] In the provinces of Saskatchewan, Manitoba and the Territories, operating dental auxiliaries (244 in 1983[19]) have served to augment the number of practitioners, particularly in rural and remote areas. In addition to increasing numbers, new technologies and materials have contributed to increased productivity by all practitioners.

In spite of increased spending on dental care, it is clear that large disparities remain in the level of per capita dental expenditures among the provinces. Such a large disparity is not found when one examines the provincial per capita expenditures on total health care. In 1975, for example, the ratio in total health expenditures between the lowest province (Newfoundland) and the highest (Ontario) was 1.4:1. Comparing this to the 4.4:1 observed in this study for 1980 dental expenditures shows that the present selective approach to coverage by governments and private dental insurance has not yet made dental services as uniformly accessible as total health care.

CONCLUSIONS

In 1980, Canadians spent $53.51 per capita on dentists' services. This has grown from $6.12 in 1960 – an increase by a factor of 8.7 times over the two decades. Per capita expenditures on dental care increased by a factor of three times when the effects of inflation were removed. In 1980, dental care expenditures represented 0.44 per cent of the Gross National Products, 5.8 per cent of total expenditures on health care and 47.4 per cent of out-of-pocket expenditures on health care.

Public funds accounted for 13.7 per cent of the nation's expenditures on dental care in 1980 – up from 1.2 per cent in 1960. Four provinces which had introduced publicly-funded children's dental programs had slightly improved their positions vis-à-vis their population's share of the nation's expenditures. However, residents of British Columbia, with the highest per capita expenditures, spent on average, 4.4 times more than the residents of Newfoundland.

The introduction of private dental insurance during the 1970's, the increasing affluence of Canadians and the increased availability of dental services over the 20-year period, may explain a large part of the observed increases.

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TABLE VI

Regional and Provincial Percentages of Canadian Population and Expenditures on Dentists' Services 1960 and 1980

		1960 Percent of Canadian		1980 Percent of Canadian		
Region	Province	Population	Expenditures on dentists' services	Population	Expenditures on dentists' services	Index of change in percent expenditures*
	Newfoundland	2.5	0.7	2.3	0.9	1.4
	New Brunswick	3.3	1.8	2.9	1.5	0.9
	Nova Scotia	4.1	2.2	3.5	2.4	1.3
	P.E.I.	0.6	0.4	0.5	0.4	0.9**
Maritimes		10.4	5.0	9.3	5.2	1.2
Quebec	Quebec	28.8	18.9	26.6	19.2	1.1
Ontario	Ontario	34.2	45.2	35.6	40.6	0.9
	Manitoba	5.1	5.1	4.3	4.1	1.0
	Saskatchewan	5.1	4.1	4.0	3.6	1.1
	Alberta	7.2	8.0	8.9	9.3	0.9
Prairies		17.4	17.3	17.2	17.1	1.0
B.C.	B.C.	9.0	13.6	11.1	17.8	1.1

$$*\frac{\%\ \text{Expenditures 1980}}{\%\ \text{Population 1980}} \div \frac{\%\ \text{Expenditures 1960}}{\%\ \text{Population 1960}}$$

**Index based on non-rounded data.

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WHY STUDY THE NORMAL PHYSIOLOGY OF THE PERIODONTIUM?

Dr. A.H. Melcher
Faculty of Dentistry
University of Toronto

INTRODUCTION

The title of this paper, "Why study the normal physiology of the periodontium", is not one dreamed up by the author, but was suggested by the organizers of Symposium 25. Also accompanying the invitation to speak was a request that speakers indicate how they believe current research will affect the practice of dentistry in the next decade or so. What an interesting challenge. But how does one meet it? One possibility would be to document the advances made by studies of biological processes in the periodontium, to argue their importance for basic understanding and clinical practice, and then to predict their effect on the dental treatment of the future. But one could, if one wished, impute to this interrogatory title an unstated, but clearly implied, second question: would it not be preferrable, even obligatory, to work directly on problems of disease, that is on periodontal disease, rather than on biological problems, when one is employed in a Faculty of Dentistry? It is this interpretation of the title that I have chosen to address in this essay.

Can one discuss the appropriateness of doing one or the other type of research, more specifically so-called basic-science type research versus so-called clinically applied research in a faculty of dentistry in isolation from looking at how scientific discoveries are made in general? I think not. Science is science, whatever the setting in which it is done. The intellectual processes are fundamentally the same, the basic scientific method is universal, the good fortune, disappointments and the follies are the same, as are the serpentine paths that must be trodden before discoveries can be made. Generally speaking, applied or clinical research, rests upon a base of knowledge provided by basic research. Paradoxically, however, the approach of the individual to science can vary enormously. At the one end of the spectrum are the scientists who attempt to answer questions purely because they find them tantalizing; at the other end are those who seek remedies to clearly defined needs. The scientists doing basic or applied types of research may fall into either category and, indeed, some individuals enjoy taking both approaches to science.

AVANT-PROPOS

Le titre de cet article: Pourquoi étudier la physiologie normale du parodonte? n'a pas été imaginé par l'auteur, mais suggéré à lui par les organisateurs du Symposium 25. En plus d'inviter les conférenciers à présenter un exposé, on leur a demandé s'ils croient que la recherche actuelle influencera l'exercice de la dentisterie dans les dix prochaines années. C'est là une question intéressante, mais comment y répondre? On pourrait sans doute se renseigner sur les progrès réalisés grâce aux études des processus biologiques du parodonte, discuter leur importance pour les connaissances fondamentales et l'exercice clinique, puis prédire leurs conséquences sur les soins dentaires de l'avenir. Par contre, on pourrait aussi, si on le voulait, attribuer à ce titre une deuxième question non formulée mais clairement sous-entendue: ne vaudrait-il pas mieux ou même ne faudrait-il pas, lorsqu'on est au service d'une faculté de dentisterie, travailler directement sur les problèmes suscités par les maladies parodontaires plutôt que sur les problèmes biologiques? Pour ma part, c'est sous cet angle que j'ai choisi d'aborder la question.

Peut-on discuter de l'opportunité de mener l'un ou l'autre genre de recherche? Plus précisément, peut-on opposer la recherche scientifique de base à la recherche appliquée entreprise dans une faculté de dentisterie sans tenir compte de la façon dont les découvertes scientifiques se font en général? Je ne crois pas. La science est la science, quel que soit le cadre dans lequel on la pratique. Les démarches intellectuelles sont fondamentalement les mêmes partout, la méthode scientifique de base est universelle, les succès, les déceptions et les sottises sont les mêmes, tout comme les sentiers tortueux qui doivent être parcourus avant de parvenir à une découverte. En général, la recherche clinique ou la recherche appliquée repose sur des connaissances fournies par la recherche de base. Paradoxalement cependant, les démarches scientifiques de chaque personne peuvent varier énormément. Ainsi, d'un côté, on voit des scientifiques qui tentent de répondre à des questions simplement parce qu'elles les fascinent et, de l'autre, on en voit qui cherchent des solutions pratiques à des besoins précis. Les scientifiques qui se livrent à la recherche appliquée peuvent appartenir à l'une ou l'autre catégorie. Il en est même qui épousent les deux démarches à la fois.

DISCUSSION

a. Some remarks on how science is done

The achievement of important discoveries is frequently a haphazard affair in which serendipity and chance observation play an impressive role. The consummation of these discoveries is not unusually the consequence of many people having done many things and for a multitude of reasons. Only near the end of the day is it seen by some individual or individuals of great perception, that a great advance is within grasp. Koestler (1970) aptly describes a factor of "ripeness', when chance or an exceptional brain synthesizes the important conclusion from what is already known. From this point on, in the health sciences, the energies of the scientists become devoted to "goal-orientated research", and this may require some or all of the approaches to research that may be categorized as "basic", "applied" or "clinical". Often the key people who move from a field that is essentially of intellectual interest to one that can fill a human need are, if we are to take health science as an example, those scientists who understand the implications of basic discovery for clinical treatment. But science is a human activity. Consequently its progress is hostage not only to ability and expertise, but also to what may be termed the "human factor", that is ambitions, emotions and interrelationships, bias and preconceptions, and character and personality (see, e.g. Bliss 1982). The process of discovery may owe its successful conclusion not only to skill but also, to an inordinate degree, to change and to the "human factor".

All this is probably self-evident to the reader, and perhaps even trite. But in case you are tempted to discard the notion of the importance of the "human factor", let me ask you to consider an illustration that recently has been thrust before us, one that illustrates nicely the importance of insight and understanding for scientific progress. A concept in modern genetics that has been accepted only during the last five years or so is that the genome of a cell may not be structurally constant, but rather that certain genes may move from one position in the genome of a cell to another. This concept is revolutionary, and has brought to Dr. Barbara McClintock the 1983 Nobel Prize for Physiology or Medicine (Lewin 1983). She first published the data to support her discovery 30 years ago, but the scientific community lacked her vision and understanding (Keller 1983), and ignored it. The importance of her work was not acknowledged until 20 years later when the phenomenon was confirmed by others. The implications of this not unusual occurrence are formidable. Acceptance of an iconoclastic discovery which flies in the face of conventional wisdom is not necessarily automatic, and may never happen, even if the experimental evidence supporting it is rigorous. The discovery could consequently be lost. Indeed, the perceptions of the most gifted amongst us may be rejected simply because peers, bogged down in preconceptions, find that these are inconsistent with established dogma. A corollary to this is that the discoverers themselves may lack the insight to perceive the potential of what they have unearthed, and must wait the attention, sometimes accidental, of others who are more imaginative and who must do it for them.

To illustrate more graphically the points that I have made above, I would like very briefly to describe below the history of the discovery of penicillin. I shall then, against this background, attempt to justify undertaking basic research on periodontium in a faculty of dentistry.

b. The Discovery of Penicillin

Comparing the relative benefit to mankind of this or that discovery is a dangerous enterprise at best and one guaranteed to provoke disagreement. However, I doubt that it takes much courage to suggest that there can be few health-science discoveries made in our time that have in their own right, or in consequence of further discovery stemming directly from the original magnificent leap forward, contributed more to human happiness than the discovery of penicillin. It is perhaps difficult in 1983 to imagine a continual threat of microbial infection; a world in which the dire consequences of puerperal fever, rheumatic fever, scarlet fever, lobar pneumonia, gonorrhea, syphilis and infection following surgery and trauma were continually to be reckoned with. This was all changed by the discovery of penicillin and the numerous other antibiotics that followed it. While we may be tempted to take this munificent benefit for granted in this day and age, it did not come to us easily. The bare facts that I shall set out below were obtained primarily from two excellent histories, those of Hare (1970) and Macfarlane (1979).

The now famous paper (Fleming 1929) announcing that cultured colonies of Staphylococci in the vicinity of contaminating mould, *Penicillin*, undergo lysis describes a serendipitous observation made in September, 1928. It was not until August, 1940, more than a decade later, when Chain, Florey and their colleagues published in *The Lancet* a paper entitled "Penicillin as a chemotherapeutic agent", that the importance of Sir Alexander Fleming's original discovery for clinical treatment became generally apparent (see Hare's reaction to the publication, Hare 1970, page 169; see also Fleming 1944a; Chain and Forey 1944; Florey 1944). Why did it take so long for the original discovery to be turned to human advantage? The answer, I believe, provides a graphic illustration of how science is done and particularly of the importance of the role of serendipity and the "human factor" in discovery. It is often thought that experimental investigation should be profitable if "properly" directed by highly qualified laboratory chiefs or institutional directors, or by omniscient science administrators in Granting Agencies. But I doubt that they are immune to the "human factor" and any more infallible in their scientific judgments and perceptions than are their counterparts in any other walk of life. Further, it is rare that any but the working scientist is intellectually sufficiently well prepared to take advantage of serendipity.

As pointed out by Hare (1970, Chapter 3), the original observation that was made by Fleming required the most incredible congruence of events, ". . . . . the odds against the occurrence of the phenomenon. . . . . (being) . . . . . almost astronomical". These odds included Fleming's unusual laboratory practices, the timing of the accidental infection of the culture plate by penicillin relative to the stage of growth of the staphylococcal culture, and even the weather!

While Fleming, who was Professor of Bacteriology in the University of London and assistant director of the Inoculation Department at St. Mary's Hospital, was excited by what he found, his colleagues, including Sir Almoth Wright, his eminent Chief, ". . . . . thought that it was no more than another wonder of nature that Fleming seemed to be forever unearthing. . . . ." This reaction may come as a surprise, but one has to remember that inhibition of one organism in culture by another, had already been described quite widely at that time (for example, see Papacostas and Gate 1928, cited by Macfarlane 1979, page 280; Chain 1944b). Furthermore, Hare suggests that "much of the neglect by others . . . . . of penicillin was due . . . . . to Fleming's inability to express himself clearly and lucidly in either words or print". An example, I believe, of the "human factor" influencing the course of science. In all spheres of life, skill in communication is essential if the thinking of others is to be influenced. Science is no exception.

Despite the relative indifference of others, Fleming began to explore his observation. Lacking skills in biochemistry, he sought help from two young physicians, one an ophthalmologist who ". . . had rather more chemical training than most of us because he had taken the biochemistry course for

B.Sc. students at Birmingham University . . .'' (Hare 1973, page 93), to concentrate and purify the active agent produced by the mould. This agent he now called penicillin. His collaborators made some considerable progress, including revealing that penicillin could not be a protein. But the work came to a stop because the opthalmologist moved on. Surprisingly, Fleming apparently made little effort to persuade him to stay or to learn the methods himself and so carry on. Perhaps even more remarkable, little of the results of their efforts were published (Hare 1970, page 98). There was another surprising omission. The culture broth containing penicillin was injected into animals and shown to be no more toxic than the broth alone. However, probably because of the then current doctrine that infecting animals by injecting organisms was artificial, no attempt was made to determine the protective effect of penicillin-containing broth injected into mice that had been inoculated with streptococci or pneumococci, organisms that were now known also to be susceptible to the activity of penicillin (Hare 1930, pages 97 and 138). This simple experiment would have brought home the clinical importance of his discovery (see below). Again, the ''human factor'' in the form of Fleming's personality and the influence of ''conventional wisdom'' influenced the progress of the work.

While Fleming attempted to use his ''mould juice'', that is the culture broth containing the penicillin produced by the cultured mould, topically for the treatment of skin wounds and conjunctivitis, neither he nor his colleagues foresaw the use of penicillin as an antibiotic and, indeed by the Spring of 1929 ''. . . he was losing interest in penicillin as a chemotherapeutic substance for the treatment of deep-seated infections'' (Hare 1970, page 99). Of interest to us, perhaps, is that the possible use of topical penicillin in wounds is mentioned in an article in the British Dental Journal (Fleming 1931). This probably is the first allusion to penicillin in the dental literature, but he in no way predicted its potential for use as an antibiotic. It is probable that this general, but most important concept was yet to be imagined. Indeed, it would seem that his main interest at this time was in its value for isolating cultures of penicillin-insensitive microbes (Fleming 1944b).

Attempts at purifying penicillin were now initiated in a different institution, not because its potential had been recognized, but mostly because the laboratory chief was interested in the products of moulds (Hare, 1970, page 100 et seq.). It is for such reasons that progress is made. Some interesting advances were made, but the work was soon abandoned because of its difficulty. The new investigators apparently knew nothing of the efforts in Fleming's laboratory to isolate penicillin! It is perhaps surprising that Fleming did not interest himself in their work having supplied them with a culture of the mould. The saga continued, for in 1934, Lewis Holt, a trained chemist at St. Mary's, was asked by Fleming to try to purify penicillin. But, according to Hare (1930, page 103), Fleming did not tell Holt about the early work in their laboratory. Holt made some progress, but eventually also gave up because of the extreme instability of the penicillin, and again, according to Hare (1930, page 104), Fleming made no attempt to persuade him to continue. One has to wonder whether penicillin would not have been purified early in the 1930's and its antibiotic value recognized were Fleming of different character and personality: more articulate and forceful, more driving and persuasive, and more domineering and aggressive; character traits not necessarily seen to be attractive socially but often valuable in the pursuit of science. Fleming was a first-rate scientist, a microbiologist whose discovery of lysosyme had brought him recognition years before penicillin entered his life, a physician who also held qualifications in surgery. However, despite what we now know to be the colossal contribution of his original observation, he left it to others to understand the importance for mankind of what he had discovered and to press for the further investigation and application of penicillin.

By this time, chemotherapy had appeared on the scene. Ehrlich had first introduced an arsenical compound, Salvarsan, for the treatment of syphilis, and this had been replaced by Neosalvarsan (Hare, 1970, page 50). The process by which Salvarsan was discovered is legend, and illustrates classically an approach to ''applied research''. It was known that arsenicals could kill spirochaetes with which mice had been infected, but the substance caused blindness in humans so, obviously, could not be used. Ehrlich then set about altering the molecule to make it more effective against spirochaetes and less toxic for humans. He synthesized 605 new compounds to no avail; the 606th was successful. No serendipity here, just persistence, patience, and determination. Neosalvarsan, which replaced Salvarsan was developed on the 914th try.

But chemotherapy really came into its own with the sulphonamides, discovered in the mid-1930's, and this is of interest here for two reasons: first, it illustrates still another pathway by which scientific discoveries are made; and second, it led to the throwing out of the window of a sacred cow (Hare 1970, Chapter 8). Prontosil, the first of the sulphonamides, was a consequence of research by the German Company, I.G. Farben Industry, which manufactured dye for the textile industry. As new substances were synthesized, they were screened as a matter of course for antibacterial activity. In contrast to what was done in Fleming's laboratory, the test model was a laboratory animal that had been inoculated with microorganisms. The compound that eventually was modified to become sulphanilamide was originally synthesized to provide a tenacious dye for wool or silk but was found, remarkably, through routine examination, to control streptococcal infections of mice. This technique of investigation, sometimes derisively termed ''a fishing expedition'', had landed a whale; there was at that time no effective treatment for the extremely dangerous streptococcal infections. It was also found that while Prontosil was effective *in vivo*, it had no effect on the organisms in the test tube. This flew in the face of current dogma that maintained that if a substance did not kill organisms *in vitro*, it could not be expected to be of value *in vivo*. Hence, the approach used in Fleming's laboratory. It is worth digressing here to point out that penicillin *in vitro* could kill susceptible organisms that were dividing and growing but could not lyse established colonies of Staphylococci, a fact not fully explained until the 1940's (Florey et al 1949).

Despite a number of limitations, Sulphanilamide and its analogues became the wonder drugs of the time, reducing for example, the incidence of puerperal fever dramatically (Hare 1970, page 143). Their mode of action also revolutionized current thinking about the nature of desirable properties of antimicrobial substances, for they did not simply kill cells, microbial and tissue alike, but rather interfered specifically with the growth and reproduction of microorganisms (Hare 1970, page 143). Furthermore, in Hare's view (page 161), ''. . . there . . . (is) . . . no doubt about it, without the sulphonamides to show the way, it is improbable that penicillin would have emerged from its obscurity''.

And now we must turn to the man who catalysed the emergence of penicillin from obscurity to the position of fame that it now occupies. That man is Howard Florey, eventually in 1965, to become Lord Florey, who, in 1935 became the Professor of Pathology at the University of Oxford. Remarkably and, as it turned out, fortuitously, Florey had previously interested himself in another of Fleming's discoveries, that of lysosyme. Florey was interested in mucus, and lysosyme occurs in secretions containing mucus. Hence, at the end of the 1920's, Florey began to work on the enzyme (Macfarlane 1979, page 180). In 1935, Florey recruited a young biochemist Ernest (later Sir Ernest) Chain. Two years later, lysozyme having recently been purified,

Chain was able to set about determining whether or not lysosyme is an enzyme. He provided evidence in the affirmative and then went on to demonstrate the nature of the enzyme's substrate (Macfarlane 1979, page 278 et seq.). In 1937-1938 Chain had become interested in the inhibition of one type of micro-organism by another (Macfarlane 1979, pages 280 et seq.; Chain 1944b); and, coming across Fleming's (1929) paper, came to suspect that what Fleming had discovered was ". . . a sort of . . . mould lysosyme . . . that . . . in contrast to egg white lysosyme, acted on a wide range of gram-positive pathogenic bacteria". Further, he wondered whether ". . . the cell wall of these bacteria contained a common substrate on which the supposed enzyme acted, and (thought) that it would be worth trying to isolate and characterize the hypothetical common substrate". So, once again, interest in penicillin was being rekindled, but not because of a flash of insight into its therapeutic possibilities but, instead, for reasons that relate purely to "basic science", the stimulation of curiosity by the reading of a paper.

To achieve his goal, Chain would first have to purify the supposed enzyme, and this he did not perceive to be a formidable task. One cannot help but remark on the fact that in 1929 Fleming's group had already realized that penicillin was not a protein but here, a number of years later, Chain was excited by the possibility of it being an enzyme, which is protein. Hare (1970, page 99) draws attention to the fact that Fleming's description of the biochemical procedures was scanty, and that he did not mention the fact that penicillin was soluble in acetone. Perhaps this would have given the game away and, if so, would Chain have retained his interest? Another quirk of fate, perhaps.

In any event, Chain and Florey eventually chose to investigate the antibacterial products produced by penicillin, B. *subtilis* and B. *pyocyaneus* (Macfarlane 1979, page 285). It is worth quoting here the reason given for the work by Chain: ". . . scientific interest. That penicillin could have a practical use in medicine did not enter our minds when we started to work on it": and by Florey, "people sometimes think that I and the others worked on penicillin because we were interested in suffering humanity — I don't think it ever crossed our minds . . . . . this was an interesting scientific exercise . . . ." (Macfarlane 1979, page 285). Investigation of penicillin was still seen as a problem of basic science, of intellectual interest. Its potential therapeutic value was yet to be realized.

However, when in 1939, Florey applied to the British Medical Research Council for funds to do the work (Macfarlane 1979, pages 298 and 299) he pointed out that "There exists no really effective substance acting against staphylococci *in vivo*, and the properties of penicillin which are similar to those of lysosyme hold out promise of its finding a practical application in the treatment of staphylococcal infections . . . . In view of the possible great practical importance of the above mentioned bacteriocidal agents it is proposed to prepare these substances in a purified form suitable for intravenous injections and to study their antiseptic action *in vivo*." At last, a decade after Fleming's original observation, the penny had dropped. And so, to all intents and purposes, the investigation entered the realm of "applied research".

Working with colleagues, Chain rapidly solved the problems of extracting penicillin and used freeze-drying to prepare the product for storage. Then, in 1940, they did the crucial experiment. They showed that if mice were inoculated with virulent streptococci, they would die, but that subcutaneous injection of penicillin would save them from this fate. Florey next set about increasing the supply of penicillin so that appropriate human trials could begin (Macfarlane 1979, chapter 13), and initiated these early in 1941 (Macfarlane 1979, chapter 14). And so the investigation moved from "applied science" to "clinical investigation", and the era of antibiotic therapy was introduced.

c. The justification for basic research in general and research on biological processes in the periodontium in particular

The story of the discovery of penicillin underlines, I believe, the importance of understanding that all approaches to research, "basic research", "applied research" and "clinical research", should be taken in health science facilities including faculties of dentistry, and that the solution of some problems relevant to clinical treatment may require expertise derived from all three categories.

It is impossible to know how and when antibiotics would have been discovered and introduced into clinical medicine and dentistry had Fleming not made his novel observation, an observation that most probably could only have been made by someone working in basic research and sufficiently immersed in his subject to recognize the significance of the unusual when faced with it. It is unlikely that "applied" or "clinical" research would have produced penicillin or discovered the use of antibiotics when the notion of antibiotics was not part of the contemporary scientific currency. Indeed, it is probably true to say that the horizons of applied research or, if one prefers it, goal-orientated research, are generally restricted by the bounds of the relevant body of knowledge that has been produced by basic research. To return to the example provided by penicillin, unique discoveries that revolutionize our thinking and our endeavours are almost always produced by "basic science" and rarely by "applied science".

This belief can be underlined further. A determination of the key papers, that is papers that had an important influence on the progress of research, that ultimately led to the ten most important contemporary advances in the diagnosis and treatment of cardio-pulmonary disease, has been made (Comroe 1977). Of these, ". . . 41% reported work that, at the time it was done, had no relation to the disease that it later helped to prevent, diagnose, treat or alleviate".

But can one argue that "basic science" in the realms of health should be left to the biologists and other basic scientists, and that the health scientists should restrict themselves to "applied research". Indeed, one hears governments and granting agencies advocating from time to time that research be relevant to clinical diagnosis and treatment. No one can dispute that when a basic discovery is perceived to have application to health, it should be investigated with all vigour. But who is to say what is the potential application to health of a basic discovery or research idea, or the extent to which the expertise possessed by basic scientists may be needed to transform an interesting observation or concept into one that has clinical value. It took ten years for the clinical application of Fleming's momentous observation to be perceived. There should always be alert and well-trained watchmen at the gate who are able to recognize the unexpected knock of serendipity, and who have developed that intuition which is the child of scientific knowledge, experience and intellectual activity, that permits a scientist to see the relevance of that which has materialized unexpectedly.

If the progress of science from initial concept or serendipitous observation to final victorious conclusion were to proceed with mathematical precision, it would be reasonable to dictate what research should be done, when it should be done and where. However, as has been exemplified so beautifully by the discovery of penicillin, this is not the way of science. In general, progress is made not by leaping but by staggering; not by a steady movement forward, but by a tortuous path that moves sometimes forward but, as often as not, sideways, backwards or in circles; not by cold, calculated reason alone, but frequently by intuition; not necessarily by adhering to a carefully laid plan, but often according to modifica-

tions made in response to unexpected findings. The first President of the Medical Research Council of Canada, the late Dr. G. Malcom Brown, maintained that scientists should be left to do that which interests them and which they in consequence will do best (Personal Communication). In the normal course of events, all of the estates of science should be well served by this approach. Inevitably, there will be individuals who are interested in more than one of the estates and who consequently, can act as the bridge between them, when appropriate.

One could now proceed to ask how one justifies "basic science" research in a faculty of dentistry; why do we not devote all of our efforts to that which is clinically relevant? Simply put, and accepting the premise outlined above, if we do not expand the scientific knowledge basic to dentistry, can we expect anyone else to do it for us? If we do not understand the advances made in basic science in areas different from our own and recognize how they can be applied to the problems and challenges that we face, who will interpret them for us? If we do not have the expertise to solve basic problems that hinder clinical application, who will provide it for us? I suspect that the answer is, no one.

This then leads us directly to the more specific question, "Why study the normal physiology of the periodontium?". First, our knowledge of biological processes and regulatory mechanisms in the periodontium is meagre. Second, knowledge of biological processes in the periodontium are fundamental not only to proper understanding of aspects of the pathogenesis of periodontal diseases and their treatment, but also to tooth movement in orthodontics, and aspects of endodontics, pathology and prosthodontics. Finally, if we do not assume responsibility for achieving comprehensive understanding of the biological processes involved in tooth support, physiological tooth movement and homeostasis, who else will do it, and who is to say that someone, somewhere, some day, will not produce information that will revolutionize one or other of our methods of treatment?

d. Some advances in the understanding of biological processes that operate in the periodontium

I will not endeavour to document or review all recent discoveries in relation to the periodontium. Instead, I would like to discuss briefly just two areas of endeavour, both of which could have important implications for the future. The first of these is the nature of the populations of synthetic cells found in the lamina propria of the gingiva and in the periodontal ligament, the two fibrous connective tissues of the periodontium. The second concerns aspects of cellular activity in the healing of surgical wounds of the periodontium.

i. The nature of populations of synthetic cells in the periodontal ligament and lamina propria of gingiva

It is evident that the periodontal ligament contains at least three populations of synthetic cells, fibroblasts, osteoblasts and cementoblasts (Melcher 1980). The lamina propria of the gingiva obviously contains populations of fibroblasts, but can it give rise to populations of cementoblasts that deposit cementum on that part of the root surface that lies adjacent to the lamina propria? As far as I know, no one knows for certain the answer to this question. Then, there is a further question: are the three populations of synthetic cells in the periodontal ligament derived from a single population of ancestral cells, or is there more than one population of ancestral cells? Similarly, if cementoblasts are eventually shown also to arise from progenitor cells in the lamina propria of the gingiva, do they and the fibroblasts also arise from a single population of ancestral cells? These may appear to be academic questions, but they do, I believe, in fact have important implications.

The width of the periodontal ligament is normally maintained within physiological limits throughout the functional life of the tooth. This is achieved despite constant movement of the tooth, such as, for example, mesial drift (Picton 1976; Vignery and Baron 1980), and the axial movement that follows occlusal wear or alterations in coronal anatomy consequent upon removal of opposing teeth (Tran Van and Mailland 1981), caries and trauma, and the treatment thereof. The width of the periodontal ligament is also restored following completion of orthodontic tooth movement (Karring et al. 1982). This is achieved by synthetic and resorptive activity of the cells associated with the involved tissues (see, for example, Vignery and Baron 1980), particularly the fibroblasts (see, for example, Hurum et al. 1982), osteoblasts and cementoblasts and, of course, osteoclasts, which are derived from cells of bone marrow (Walker 1973 and 1975) and will not be discussed here.

The activity of both synthetic and osteoclastic cells is regulated by homeostatic mechanisms of unknown origin and nature, although electrical (Davidovitch 1981; Rodan 1981) and chemical (Rodan 1981) regulators have been suggested. It is evident that these putative regulators are influenced by functional stimuli (Cohn 1965), but the precise nature of their action is unknown. What is clear is that the periodontal ligament is central to homeostasis in the periodontium, for its extirpation or death results in ankylosis between bone and tooth (Melcher 1970; Line et al. 1974; Andreasen 1976). What is not clear, on the other hand, is whether the cells of the periodontal ligament are self-regulatory or are regulated by external stimuli.

Do the fibroblasts, osteoblasts and cementoblasts, and other cells in the ligament, "talk" to each other, probably through chemical signals (Rao et al. 1978; Svoboda et al. 1979; Merrilees et al. 1983), and so maintain their various domains consistent with the position of the tooth (Melcher 1976), or do external stimuli, perhaps neurochemical in nature, or vascular, regulate their activities, or are both mechanisms operative? I do not think that anybody knows the answer to this question, although there are fragments of evidence that suggest that the first mechanism does play a significant role (Boyko et al 1981).

A number of stages can be identified at which mechanisms that regulate homeostasis could operate. These include mitosis of precursor cells, differentiation of precursor cells to express the required phenotype, and migration of cells to sites where there is a need for them to synthesize their product or resorb extracellular substance. Little is known.

There is some evidence that, in periodontal ligament functioning under physiological conditions, there is a continual turnover of cells, of the order of three to 12 cells in every 1,000 cells dividing at any given moment (Roberts and Jee 1974; McCulloch and Melcher 1983a). These ancestral cells are located predominantly, but not exclusively, within about 10 um of blood vessels (McCulloch and Melcher 1983a). There is also evidence that cells found in the vicinity of the surface of bone and cementum migrate there after their precursors have divided in other situations (McCulloch and Melcher 1983b). These cells that occupy positions adjacent to the mineralized tissues could be osteoblasts or cementoblasts respectively, or fibroblasts responsible for maintenance of the extracellular substance of the periodontal ligament in the vicinity of these mineralized tissue surfaces. Three questions, basic and important, but difficult of solution, stem from these observations. First, as enunciated above, do all of the three phenotypes, fibroblasts, osteoblasts and cementoblasts have the same ancestral cell or do each have one specific precursor for the phenotype? If the former situation exists, how is selective differentiation of each phenotype regulated, and how is division of the common ancestral cell regulated? If the latter, how is selective division of each of the ancestral cells regulated? Second, how is selective migration of each

phenotype to the site where its activity is required, regulated? And, third, how is the activity of each phenotype and the balance between synthesis and resorption of extracellular substance regulated?

If these and other basic questions could be answered, then it should be possible for us to regulate cell activity in therapeutic procedures much more accurately and precisely and with much finer control than currently is the case. But before we can even begin to consider clinical application, much additional "basic research" must be done in order to provide the fundamental information that is needed to exploit these concepts in clinical treatment.

We currently treat malocclusion by achieving movement of teeth through the application of sophisticated orthodontic appliances. Some afflictions are treated by surgery. However, it is not the orthodontic appliance or the surgery that achieves for us our end; the cells of the part do that for us. Orthodontic appliances and surgical procedures produce desired results only in living organisms, that is in the presence of viable cells. What we do with our appliances and surgical procedures is to convey messages to the cells, instructing them to embark on the activities that will produce the results that we seek. But how indistinct and garbled must these messages be, given the crude instructions that we provide. If we understood the nature of the physiological regulators of the cells in question, we could speak directly to the cells in their own language and instruct specific populations of connective tissue cells to resorb or synthesize extracellular substance of the appropriate type (see, for example, Limeback et al. 1983) and architecture in the precise locations required. It is my belief that some time in the future, but it is impossible to say how far into the future, much of tooth movement and what is currently achieved by surgical methods will be accomplished by the selective application of cell regulators to the precise sites where remodeling of tissues is required, and in the appropriate temporal sequence. Whether these regulators turn out to be chemical, electrical or of some other nature remains to be discovered.

ii. The healing of surgical wounds of the periodontium

Regeneration following wounding implies restoration of all aspects of structure, architecture and function to that which pertained before injury. Repair, on the other hand, simply requires restoration of continuity of tissues without regard for structure and function. Repair in mammals is readily achieved, regeneration almost never so. However, regeneration can normally be expected in the healing of wounds of Urodaeles. Yet, we have for many years, and still do aspire to achieving regeneration of periodontium following surgical intervention for the treatment of periodontal diseases.

Surgical treatment of periodontium almost always results in repair in which the normal relationships between the tissues of the periodontium are distorted. In particular, and most commonly, the alveolar process is not restored to is former bulk and contour, the axial extent of attachment of lamina propria of gingiva to tooth is decreased and the axial length of attachment of junctional epithelium to root surface is increased forming a so-called long-junctional epithelium. Fundamental to regeneration is provision of circumstances which would ensure consistent and predictable new attachment of collagen fibres of periodontal ligament and laminal propria of gingiva to tooth.

It used to be believed that this new attachment of fibres to tooth could be achieved predictably only if cementoblast, probably derived from periodontal ligament, migrated to and colonized that part of the root where new attachment was required, and deposited cementum to anchor the fibres to the tooth (for example, see Melcher 1976). However, recent observations have suggested that new attachment may be improved if the root surface in the wound is demineralized, exposing collagen fibres of the mineralized matrix (e.g., see Register 1973; Register and Burdick 1976; Crigger et al. 1978; Boyko et al. 1980). This is because new collagen fibres synthesized in the fibrous connective tissue can readily be "spliced" to the exposed collagen fibres of the mineralized connective tissue, so converting a complex mineralized tissue-soft tissue wound to a simple soft tissue wound in which fibrous continuity can be reestablished in the absence of cementum (Crigger et al. 1978; Boyko et al 1981). Interestingly, there is evidence of abundant cementogenesis following this form of new attachment (Nalbandian and Cote 1982; Deporter and Melcher, Unpublished Observations), leading one to wonder whether cementogenesis in the adult organism may not be dependent upon the prior establishment of a fibrous attachment and subsequent stimulation of cells by the activity of functioning fibres attached to the tooth.

It is evident that factors additional to that of facilitating "splicing" of fibres to tooth may be involved if healing is to be improved (Boyko et al. 1980; Fernyhough and Page 1983; Lowenberg et al. 1983; Pitaru and Melcher 1983; Pitaru et al. 1984). These factors can be investigated best *in vitro* because the experiments can be designed more tightly and better controlled than is possible *in vivo*. Consequently, techniques of basic science must be used. But why worry to do this if an empirical method for improvement has already been demonstrated? The reason is that there may be more to the phenomenon than meets the eye, and that the way forward may be provided not only by demineralizing the root surface but also by modifying it in other ways. A number of factors are known to influence wound healing, and these include rate of division of ancestral cells, migration of cells into the wound, chemotaxis so that the cells migrate to the site where they are needed, attachment of cells to the substrate adjacent to where they must synthesize extracellular substance, in this case root surface, and expression of phenotype. It is now important to discover what are the most potent modifiers of these activities, which are the most selective with respect to cell type, and which will most effectively promote regeneration. Once this has been achieved, then the knowledge can be applied to the *in vivo* situation in an endeavour to encourage fibroblasts to colonize specific areas of the root in large numbers and to express the required phenotype so that new attachment of fibre to tooth can be achieved predictably. Similarly, it may be possible to encourage epithelial cells to attach to certain sites coronally and to discourage them from attaching to others more apically on the root surface.

This "basic research" is also having the effect of changing the approach to surgical treatment of the periodontium from one that is essentially empirical to one that is rational and much more desirable; much more desirable because the practitioner can then understand precisely why a given procedure should be applied and when, and what can be expected from it. This is a great improvement over relying on the old but blind adage, "because it works in my hands", for justifying a particular procedure. And this, to my mind, is as important a reason for doing "basic research" in a faculty of dentistry or, more specifically, research on physiology of periodontium, as any.

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This product contains codeine and should not be administered to children except on the advice of a physician.

Precautions: The sedative effect of codeine is additive to that of other CNS depressants, including alcohol. Dosage may need to be reduced when administering this product with other CNS depressants and patients should be cautioned about driving a car or operating potentially hazardous machinery if they become drowsy or show impaired mental or physical abilities while taking codeine.

This product has the potential for being abused.

Safety in pregnancy has not been established. The product should not be administered during pregnancy unless, in the judgment of the physician, the potential benefits outweigh the possible hazards.

Adverse Effects: Acetaminophen may occasionally cause gastric upset. The incidence and severity of this adverse effect is less than that after A.S.A. administration.

The most common adverse effects of codeine include light-headedness, drowsiness, nausea and constipation. Respiratory depression is seen in higher dosage.

Overdose Symptoms: The manifestations of an overdose of TYLENOL NO. 1 FORTE acetaminophen with codeine capsules are those of acetaminophen overdose combined with an exaggeration of the adverse effects of codeine.

The early symptoms of acetaminophen overdose overlap the symptoms of codeine overdose and include gastrointestinal irritability, nausea, vomiting, anorexia, diaphoresis and pallor. Symptoms of hepatic necrosis may become evident from three to five days following ingestion.

In sufficient overdose codeine can cause euphoria, dysphoria, miosis, a decrease in respiratory rate, cyanosis, and hypotension. Death due to respiratory failure may result.

Treatment: The stomach should be emptied promptly by lavage or induction of emesis with syrup of ipecac.

The hepatotoxic effect of acetaminophen overdose can be countered with the antidote N-acetylcysteine. Further information on the clinical course of acetaminophen overdose and its treatment with N-aceylcysteine is available from Johnson & Johnson Baby Products Company or McNeil Pharmaceutical (Canada) Ltd.

The respiratory depressant effect of codeine overdose can be countered with a specific narcotic antagonist such as naloxone. In the presence of hypoventilation or apnea, oxygen should be administered and respiration assisted or controlled. A patent airway must be maintained.

Adult Dosage: TYLENOL NO. 1 FORTE acetaminophen with codeine: 1 or 2 capsules 3 - 4 times daily as required, not to exceed 8 capsules in a 24-hour period. Do not exceed the recommended dose unless advised by a physician. Use longer than 5 days only on the advice of a physician.

Supplied: TYLENOL NO. 1 FORTE acetaminophen with codeine: Each red and grey opaque hard gelatin capsule (size "0") printed McNEIL in black along the grey half and the McNEIL logo printed in black along the red half contains 500 mg acetaminophen, 15 mg caffeine in combination with 8 mg codeine phosphate.

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ACUTE EXACERBATION
IN CHRONIC PERIODONTAL DISEASE

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The Journal continues to publish papers presented at Symposium 25, held at the University of Manitoba in November of 1983, when the Faculty of Dentistry was marking its 25th anniversary.

Seven papers on the subject of Dental Caries have been published, and now seven on Periodontal Disease will follow. The first three are being published in this edition.

ABSTRACT

The dental profession has been taught to consider periodontal disease as a continual process by which the bone and collagen that provide tooth support are slowly lost. Estimates of 0.1 mm/yr attachment loss suggested by epidemiologic studies have reinforced the concept of continuous disease. This premise has had a dramatic influence on both the science and therapy of periodontal disease. If the disease process is continuous, then it is ever present. Therefore, any organism, enzyme, or mediator found in deep pockets at any time would be assumed to be disease related. Furthermore, because the disease has been assumed to be ever present, therapeutic intervention is always indicated.

Recent observations based on longitudinal attachment level measurements of subjects with chronic periodontitis have revealed that periodontal disease is episodic, *characterized by repeated acute exacerbations followed by longer periods of remission. Attachment loss in subjects with deep pockets appeared to occur in "bursts" of short duration at approximately 5 per cent of periodontal sites per year. Periodontal destruction during these disease episodes can spontaneously reverse or can result in sustained attachment loss. The attachment level of most sites (83 per cent) within the same mouth, even those with deep pockets, does not change during monitoring periods of one year. The concept of periodontal* disease activity, *a significant increase in periodontal attachment loss as detected by longitudinal monitoring has resulted from these observations. Although bone loss seems to occur at the same time as attachment loss, radiographic evidence of crestal loss does not appear until approximately six months later. These recent observations will necessitate reevaluation of conventional theory.*

SOMMAIRE

La profession dentaire a appris à considérer les maladies parodontaires comme un processus continu suivant lequel l'os et le collagène qui fournissent un support aux dents se perdent lentement. En épidémiologie, on a calculé que l'adhésion se perd au rythme de 0,1 mm par année, ce qui était le principe voulant que la maladie soit progressive. Ce principe a eu d'énormes conséquences sur la parodontie et le traitement des maladies parodontaires. Si le processus est continu, il faut en effet que la maladie soit toujours présente. Aussi tout organisme, tout enzyme ou tout médiateur trouvé dans les culs-de-sac à quelque moment que ce soit est-il associé à la maladie. En outre, parce qu'on suppose que la maladie est toujours présente, des soins thérapeutiques paraissent constamment indiqués.

Récemment, des observations basées sur des mesures de l'adhésion longitudinale chez des sujets souffrant de parodontite chronique ont révélé que les maladies parodontaires se manifestent sporadiquement *et se caractérisent par des exacerbations aiguës répétées suivies de périodes de rémission plus longues. Chez les sujets présentant des culs-de-sac profonds, la perte d'adhésion semble se produire par crises de courte durée affectant environ cinq pour cent des régions parodontaires par année. Le dommage causé durant ces moments de crise peut se réparer de lui-même ou entraîner une perte d'adhésion prolongée. Chez tous les sujets, même ceux qui ont des culs-de-sac profonds, le taux d'adhésion de la majeure partie des régions parodontaires (83 pour cent) ne change pas au cours d'une période de surveillance d'un an. À la suite de ces observations, on a formulé le principe de* l'activité parodontaire *pour désigner une importante perte d'adhésion parodontaire telle qu'on a pu l'observer en surveillant l'adhésion longitudinale. Bien que des pertes osseuses semblent se produire en même temps que la perte d'adhésion, il faut attendre six mois environ avant que les radiographies ne révèlent des pertes au niveau des crêtes osseuses. Vu ces observations récentes, il faudra revoir la théorie conventionnelle.*

INTRODUCTION

Acute exacerbation in chronic periodontal disease might seem a contradiction in terms. One often thinks of chronicity as a slow, gnawing process, something that goes on interminably and continually. That does not seem to be the case. Chronic diseases generally have periods of exacerbation and remission, arthritis "flare-ups" being a noteworthy example. Although periodontal disease "flare-ups" are not well publicized, they have been recognized for many years. An early reference to the nature of periodontal disease is found in the writings of G.V. Black, who interpreted periodontal disease as the result of recurring inflammatory exacerbations.[1] In 1955, H.R. Stanley published a paper based on a histological study of human skull specimens. He noted that interproximal calculus appeared in altering masses of scaly and nodular formations. Interpreting these findings, he stated, ". . . an explanation for these observations can best be appreciated by placing them in a reasonable order of sequence, the repetition of which takes on the character of a cyclic phenomenon."[2]

More recently, investigations have suggested episodic disease activity can occur in animals with periodontal disease. In a study of rats monoinfected with *Actinomyces naeslundii*, Garant stated that "Because this degree of osteoclastic activity was observed in but a small percentage of the interdental areas, it is felt that alveolar bone destruction in the early phase of disease is the result of repeated short bursts of osteoclastic activity associated with periods of acute inflammation."[3] From a study of ligature-induced periodontal disease using squirrel monkeys, Heijl and co-workers stated, ". . . it is conceivable . . . that the major destructive phases of the disease result from acute exacerbations comparable to those experimentally produced in this study."[4]

In a study of human periodontal disease,[5] Hirshfeld and Wasserman stated that "The disease process often followed a cyclical active pattern. Irregularly spaced cycles of destructive activity were evident in all response groups, even in the WM (well-maintained) group." In one of a series of papers concerning longitudinal epidemiology of human periodontal disease,[6] Loe and colleagues stated that, ". . . it is not known to what extent the progress of the lesion is continuous or if the disease is characterized by intermittent periods of activity and inactivity. . ." Clearly, many periodontal research workers have been cognizant that cyclic phenomena in disease activity could explain the clinical appearance of the disease process. This observation is important for understanding the natural history of periodontal disease and the methods used to treat it.

DISCUSSION

The classic model of periodontal disease,[7] the continuous disease model, is illustrated in **Figure 1**. Several periodontal sites are depicted along the X axis.

The attachment loss at each site is represented by the bar length at each time point. The breakdown of a site proceeds in a gradual and continuous manner as supportive tissue is slowly destroyed. At some point later in time, another site starts to slowly deteriorate with the formation of another measurable loss. The time of onset and the rate of destruction vary from site to site; other sites show no destruction. This model has been the common conceptual framework for periodontal disease progression.

Longitudinal measurement of attachment level was performed with conventional periodontal probes.[8] Since it is recognized that the probe penetrates beyond the base of the pocket under disease conditions,[9] this measure should, perhaps, be better termed "apparent attachment." In practice, attachment level is computed from two measurements: the pocket depth and the distance from the top of the gingiva to the CEJ (assigning negative values for recession).

The highly localized nature of periodontal disease necessitated the definition of sites so that repetitive longitudinal measurements could be referred to specific locations on the periodontium. Six sites were numerically designated on each tooth, as follows:

1 = mesio-buccal
2 = buccal (or facial)
3 = disto-buccal
4 = disto-lingual
5 = lingual
6 = mesio-lingual

Quadrants were designated as follows:

1 = maxillary right
2 = maxillary left
3 = mandibular left
4 = mandibular right

Teeth were designated as:

1 = central incisor
2 = lateral incisor
3 = cuspid
4 = first bicuspid
5 = second bicuspid
6 = first molar
7 = second molar

This resulted in the QTS (Quadrant-Tooth-Site) site identification code. For example, site 264 represents the disto-lingual measurement of the maxillary left first molar. By maintaining these labels for each site, a temporal history of that site could be retrieved and evaluated by computer search techniques.

To determine the reproducibility of this method, attachment level measurements were made on 27 subjects in duplicate, each repeat measurement being taken within 14 days of the first. From a total of 9,993 duplicate measurements (**Table 1**), an average standard deviation of 0.85 mm was computed.

An estimate of error based on probing reproducibility can be obtained from this data. For example, a change of twice 0.85 mm, or approximately 2 mm, results in a significance level of $p<0.05$, and a change of three times 0.85, or approximately 3 mm, produces a significance level of $p<0.01$. In approximate terms, the probability would be 1:20 that a clinician would be in error, if a loss of 2 mm was due to disease activity rather than measurement variability. The probability of error associated with 3 mm attachment is reduced to approximately 1:100.

The attachment level of 128 sites in each of 22 subjects was monitored for a year on a monthly basis. During this period, none of the subjects were treated. All subjects had historic evidence of periodontal destruction at the time they came into the study, as evidenced by at least 20 per cent of the sites with a pocket depth greater than 4 mm. The initial analytical approach, based on the concept of the natural history as described in **Figure 1**, was to consider the data at each site over time by fitting a regression line through the measurements (**Figure 2**). By this procedure, the slope of that regression line was tested against zero slope. If the t-test indicated that change in attachment level had occurred, the site was considered disease active during the one-year monitoring period.[8]

To design more efficient experiments, several questions had to be answered. First, if periodontal destruction was a slow, continuous process, then how long would one have to monitor a subject before a significant loss was detected? Second, how would one design an experiment that ran for shorter periods of time on a group of subjects, and how many disease sites would be identified over any given period? To answer these questions, a computer algorithm was devised to repetitively perform regression analysis. By considering each site, starting at time zero and beginning with the first three sites, then the first four, and the first five, and so on, each time was tested for significance against zero slope. This procedure is illustrated in **Figures 3, 4**, and **5**. In **Figure 3**, the first three tries of the series did not produce regression lines where slopes differed significantly from zero. In **Figure 4**, the next three regression lines all differed significantly from zero slope. In

TABLE 1

Standard deviation of replicate attachment level measurements in 27 subjects. Each site was measured twice within 14 days and the standard deviation of N duplicate measurements was computed in each subject.

Subject	N	Standard Deviation	Subject	N	Standard Deviation
HM	504	0.52	LD	324	0.84
GH	324	0.61	BC	162	0.85
RP	468	0.61	ER	168	0.86
RB	504	0.61	AB	432	0.87
RC	168	0.62	AM	486	0.91
RJ	498	0.65	HC	592	0.94
FS	486	0.69	JR	414	0.99
CL	570	0.71	AH	96	1.02
PA	534	0.73	MP	336	1.06
NR	324	0.74	MF	168	1.13
AP	672	0.75	MK	168	1.30
RS	672	0.77	CS	300	1.30
SW	300	0.79	MB	167	1.30
RK	156	0.83			

TOTAL 9993
Average Standard Deviation 0.85

TABLE 2

Summary of findings of study to detect significant changes in attachment level by a regression procedure.

	# of Sites	%
No Significant Change	956	82.8
Significantly Shallower	133	11.5
Significantly Deeper	66	5.7
	1155	
Of those becoming deeper:		
Reversing	28	42
Nonreversing	22	33
Could Not Be Determined	16	24
	6	

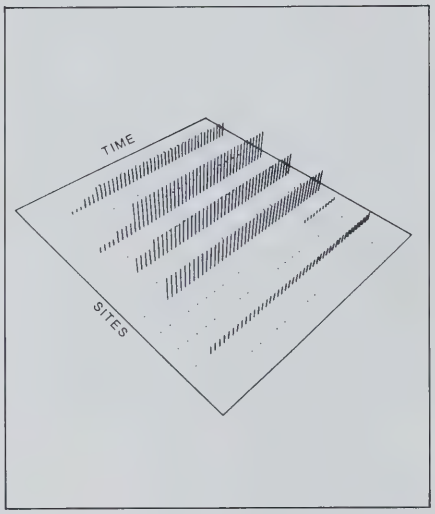

Fig. 1 Representation of the classic model of chronic periodontal disease. Diseased periodontal sites are shown as slowly but continually losing attachment with time.

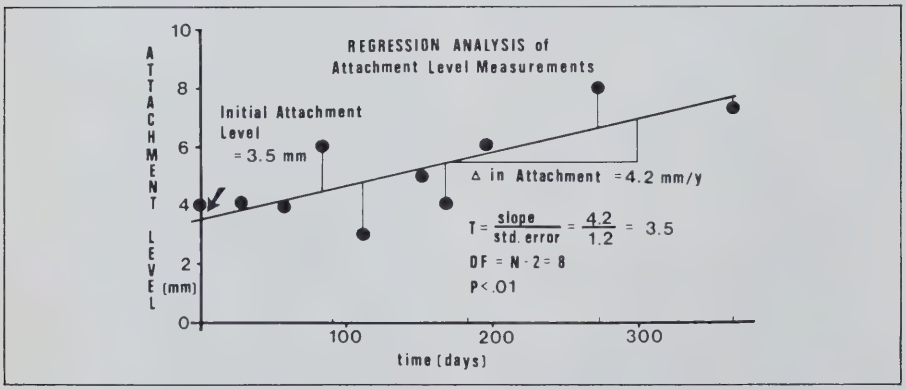

Fig. 2. Method of regression analysis applied to attachment level measurements. Derived parameters include the initial attachment level (y-intercept), slope (change in attachment), and T (slope/ standard error). Significant departure from zero was tested by a two-tailed t-test for N-2 degrees of freedom. Significance at the $p<0.01$ level.

Figure 5, the last three regression lines failed to depart significantly from zero.

This procedure, applied to an episodic occurrence of attachment loss, produced a transition from insignificance to significant departure from zero slope and, finally, a return to insignificance. This analysis was performed on all sites from all subjects monitored and demonstrated a previously unsuspected phenomenon (**Figure 6**). In the majority of sites, no change occurred. However, scattered areas throughout the mouth in each of the subject changed; sometimes for the better and sometimes for the worse.

Three patterns were identified by these procedures. The first was the cyclic event of exacerbation followed by complete recovery (**Figure 7**). Patterns of this type suggested that it was not necessary that the site lose in the battle of periodontal disease. In this pattern, one can imagine that infection was established at some time, and, as a consequence, the probe penetrated deeper into the tissue. Subsequently, as the host developed its defences, the site "cured" itself without therapy.

The pattern illustrated in **Figure 7** was not always the case. Periodontal disease characterized by irreversible loss of attachment also occurred. **Figure 8** illustrates a second pattern in which a shallow site deepened without reversal. This represented an irreversible loss pattern, a process leading to the clinical appearance of periodontal disease as commonly seen by the practitioner.

A third pattern was the spontaneous recovery as illustrated in **Figure 9**. Here, the subject presented with advanced attachment loss which spontaneously decreases. Although unexpected, this pattern was a common observation in all data sets thus far analyzed. This observation implied that sites with advanced attachment loss can decrease in probeable attachment level without therapy.

In summarizing the data of all subjects monitored (**Table 2**), 82.8 per cent of the sites did not change over the period of a year. Only 5.7 per cent of 1,155 sites monitored became significantly deeper; whereas, 11.5 per cent of the sites became shallower without treatment. Of those sites that became deeper, 42 per cent spontaneously improved after deepening, 33 per cent exhibited an irreversible change, and the remaining 24 per cent could not be categorized because the change occurred towards the end of the one-year monitoring period of the study.

Since these initial studies began, improved methods for the detection of periodontal disease activity have been described.[10] Regression analysis was found most sensitive to slow, steady changes, such as those occurring as a result of gingival recession.

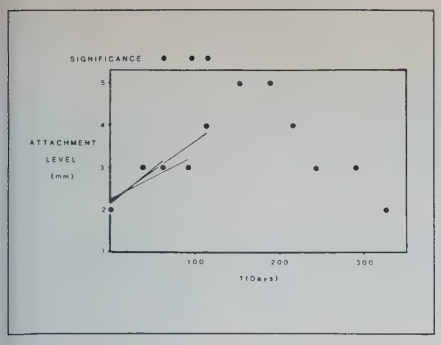

Fig. 3. *Method of repeated regression analysis of attachment level data, Phase I. Testing the slope of the first 3, 4, and 5 points did not result in slopes which differed significantly from zero.*

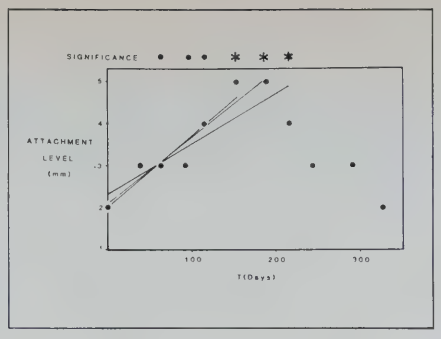

Fig. 4. *Method of repeated regression analysis of attachment level data, Phase II. The t-test of the first 6, 7, and 8 points all resulted in slopes which differed significantly from zero.*

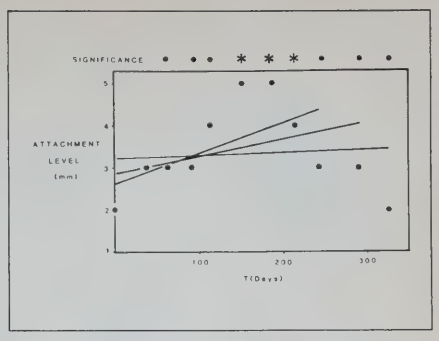

Fig. 5. *Method of regression analysis of attachment level data, Phase III. The t-test of the first 9, 10, and 11 points did not result in slopes which differed significantly from zero.*

This method was unduly influenced by an incorrect initial measurement and required many measurements for early detection. A method of running medians and a tolerance method appeared to correct many of these deficiencies. Upon application of these analytical improvements, the overall picture of disease activity was not substantially altered; small percentages of sites lost attachment, a small percentage "gained" attachment spontaneously, and the majority of sites did not change significantly (**Table 4**).

These observations suggested a second model called the random burst model (**Figure 10**). This model, as compared with the earlier model of the continually progressive disease concept (**Figure 1**), is characterized by abrupt loss patterns. A subject begins in a state of health at all sites. At some time, a site becomes infected and loses attachment. That site could remain at the new attachment level or subsequently undergo a second loss phase. Much later in time, other sites may become active, until the clinical picture of periodontitis begins to emerge. By this model, it is reasonable to assume that random bursts of activity representing localized infections become established at various periodontal sites, cause destruction, and spontaneously resolve through some host defence mechanism.

Insight into the attack mechanism is gained by considering the distribution of attachment levels in a group of subjects. The composite distribution of attachment loss in 23 subjects (**Figure 11**) suggests that periodontal disease attack is random. Least-squares fit of the proportion of sites with different attachment levels, results in a curve fitting an exponential function with an R^2 value of 0.92. This type of distribution function is used to predict the decay of a radioisotope or the probability that a particular light bulb would fail at a particular time. It is a distribution function associated with random events. In spite of this observation, there are certain elements of nonrandom behavior. For example, disease activity occurs more frequently in molar areas, particularly the interproximals of the first and second molars.[10] Although periodontal disease randomly affects teeth irrespective of their initial attachment level, it is not random in site disposition.

A second element of nonrandom behavior is a clustering of disease attack in time. Repeat longitudinal probing data provide an estimate of attachment loss over the period measurements were taken. A comparison of current attachment loss with prior estimated loss (assuming the subject began to exhibit signs of periodontal disease at age 12) indicates the period within a person's life when disease activity must have occurred.

At one end of the spectrum, the prior attachment loss of subject AB (**Table 3**), was 346 site mm as determined by adding all the attachment loss values recorded at the first visit. Considering that this subject was 50 years at the time of monitoring, an average attachment loss rate during the 38 years before monitoring would have been 10 site mm/yr. Since 58 site mm of loss per year was measured during the monitoring period, it would have taken the subject only six years to have arrived at the state

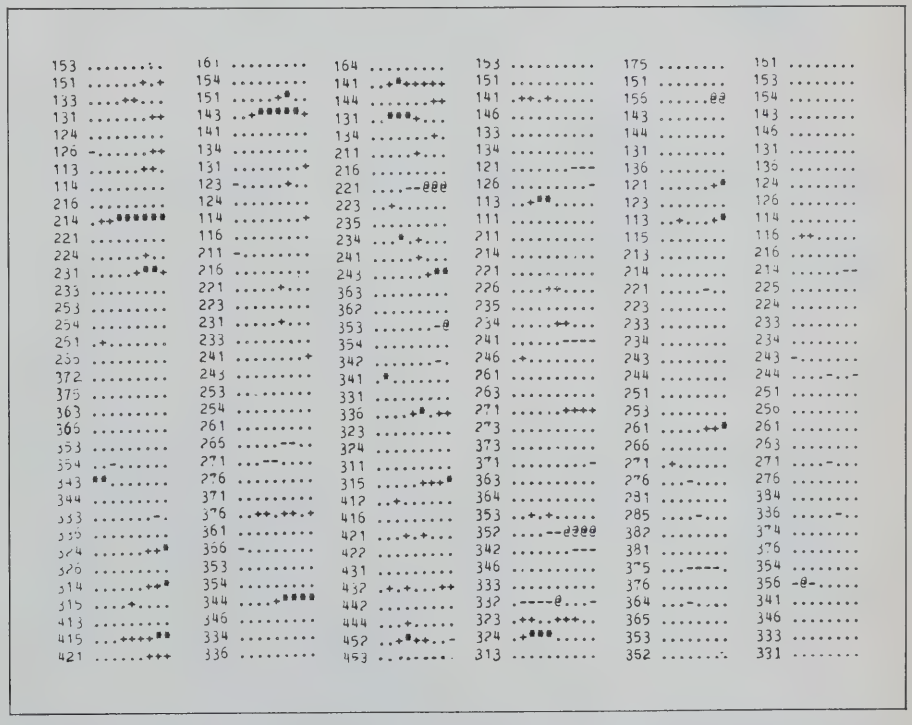

Fig. 6. *A portion of initial computer output indicating episodic changes occurring at individual sites. Numbers represent the QTS designation of the site (see text), period (.) indicates no change, plus (+) indicates attachment loss at $p<0.05$, asterisk (*) indicates attachment loss at $p<0.01$, minus (−) indicates attachment gain at $p<0.05$, and the "at" symbol (@) indicates attachment gain at $p<0.01$. Each column represents one subject and each symbol represents one time point starting at the third visit.*

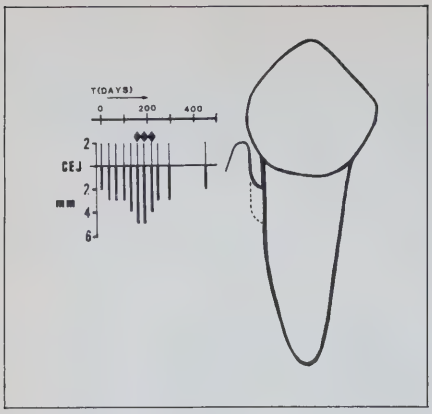

Fig. 7. Pattern of reversing attachment loss. A site on the distal of an upper second premolar (253) in which the pocket went through a cyclic period of deepening followed by a spontaneous return to its original depth. Diamond symbols in this figure and the two following figures represent periods at which t-test of the slope of a fitted regression line differed significantly from zero.

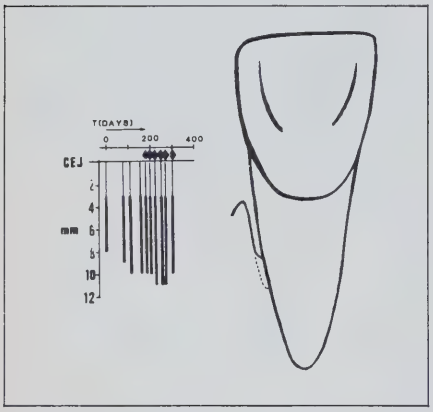

Fig. 8. Pattern of nonreversing attachment loss. A site on the distal of a central incisor (214) exhibiting an increase in probing depth maintained through subsequent measurement periods.

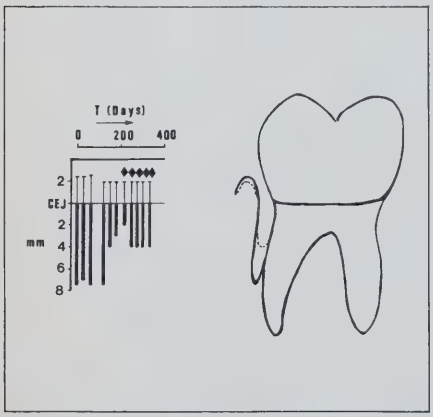

Fig. 9. Pattern of spontaneous recovery. A site on the mesial of a maxillary molar (181) in which the probing depth became significantly less without having been treated.

TABLE 3

Comparison of prior and current attachment loss. Prior attachment loss is computed as the sum of loss (in millimeters) over all sites using measurements of the first available visit. Average rate is computed assuming the disease started at age 12. Current rate is determined from attachment loss during the monitoring period. Years required at current rate is determined by dividing prior loss by current rate.

Patient	Age	Prior Loss (site mm)	Average Rate (site mm/yr)	Current Rate (site mm/yr)	Years Required at Current Rate
AB	50	346	10	58	6
MB	29	1411	83	228	6
PA	42	621	21	20	31
ER	41	857	30	12	71
SW	31	675	36	0	∞

TABLE 4

Attachment level and radiographic measurements of untreated subjects with periodontal disease. Data represents that of Lindhe et al.,[14] Haffajee et al.,[10] and Goodson et al.[9]

	Lindhe et al.	Haffajee et al.		Goodson et al.
METHOD:	UNPAIRED TOLERANCE	MEDIAN SMOOTHED	REGRESSION	RADIOGRAPHIC CHANGE
SITES SIG. LOSS (%)	11.7	2.6	5.7	6.1
WITH: SIG. GAIN (%)	0.3	1.5	11.5	8.2
# of SUBJECTS	65	22	22	
MEAN AGE	51	35	32	
# of SITES	4,515	3,414	1,155	231
MONITORING PERIOD (y)	6	1	1	
PROBE FREQUENCY	3/6y	2/2 mo.	1/mo.	

presented. In comparison, the prior attachment loss of subject PA, age 42, was 621 site mm for an average of 21 site mm/year. At the time of monitoring, loss was 20 site mm/yr. This subject was losing periodontal attachment at the same rate predicted from prior loss. At the opposite end of the spectrum, subject SW had lost 675 site mm attachment of an estimated rate at 36 site mm/yr. This subject presented at the age of 31 with extensive attachment loss, but during a year's monitoring exhibited no further loss of attachment.

These calculations indicated that periodontal disease activity did not occurr uniformly in a probabilistic continuum over an individual's lifetime. There are periods during which accentuated periodontal activity was evident, and times when remission or inactivity was evident. Acne provides an analogous pattern of bursts of infective activity in discrete periods of an individual's life. Often the individual will overcome the problem of acne and have no further exacerbation. Periodontal disease may occur in a similar manner. Considering a group of 22 subjects (**Figure 12**) analyzed as described above, 50 per cent had greater activity prior to monitoring, and 50 per cent had greater current activity.

The characteristic of clustering in time suggested a third disease model which seems to more accurately describe periodontal disease. This model, the asynchronous multiple burst hypothesis (**Figure 13**), describes a condition where periodontal disease occurs at multiple sites at some period in an individual's life. Once this has occurred, individuals may go for long periods of time with no further breakdown. Case histories of subjects exhibiting periods of prolonged remission of the active periodontal disease state have been reported.[11,12]

Disease activity based on attachment loss should relate to bone loss. This relationship constitutes an important vertification of disease activity by independent means. To study this relationship, standardized radiographs were analyzed by methods similar to those used by periodontists.[13] Images of the standardized x-rays were projected onto

an XY recorder with a digital output. A pointer attached to the pen carriage was used to locate the coordinates of points on the tooth. The CEJ-crestal bone height image distance (A, **Figure 14**) and the CEJ-root tip image distance (R, **Figure 14**) were determined by computation of the distance between points selected using the XY recorder pointer. The A/B ratio was then multiplied by the mean root length of that tooth type to obtain an estimate of the alveolar bone height.

The results of these measurements, as compared with attachment level change measurement in the same subject group and in two other groups, are illustrated in **Table 4**. The per cent of sites exhibiting significant loss (6.1 per cent as compared with 5.7 per cent) and the per cent of sites exhibiting significant gain (8.2 per cent as compared with 11.5 per cent) by the two methods (radiographic and attachment loss measurement) were comparable within the same subject group.

When these data were compared on a site by site basis, none of the sites that were breaking down according to radiographic bone loss were identified as sites that were breaking down according to the measurement of attachment loss. To reconcile this apparent discrepancy, the data were examined more critically. The findings are illustrated by four representative sites in **Figure 15**. In each case, radiographic loss in alveolar bone height was preceded by a period in which the attachment level measurements were indicative of disease activity. Furthermore, the period during which bone loss was measured coincided with spontaneous remission. All subjects with significant bone loss belonged to the 11.5 per cent of subjects exhibiting significant gain in attachment during the monitoring period (**Table 4**). These seemingly contradictory observations can be rationalized by the single assumption that attachment loss precedes radiographic evidence of bone loss. Although few sites were detected in which combined attachment level and radiographic measurements were available, these data suggested a lag period of six to twelve months between detection by attachment loss and detection by radiographic evidence of crestal bone loss (**Figure 15**).

To test the hypothesis that the time of observation of attachment loss and the time of observation of bone loss occurs sequentially in time, three corollaries were considered. If attachment loss (A) precedes bone loss (B), then:

I. A would precede B in most, if not all cases.
II. The occurrence of B would fail to predict A.

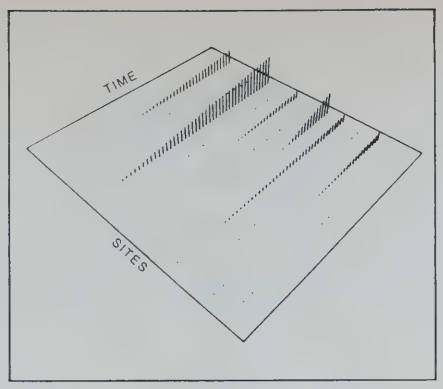

Fig. 10. *Representation of the random burst model of chronic periodontal disease. Disease active sites are shown to abruptly lose attachment at different sites in the mouth at differing times.*

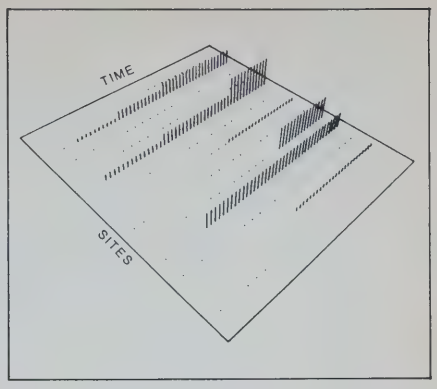

Fig. 13. *Asynchronous multiple burst hypothesis of chronic periodontal disease. Diseased sites are shown to abruptly lose attachment, as in Figure 10, but the loss occurs simultaneously at multiple sites.*

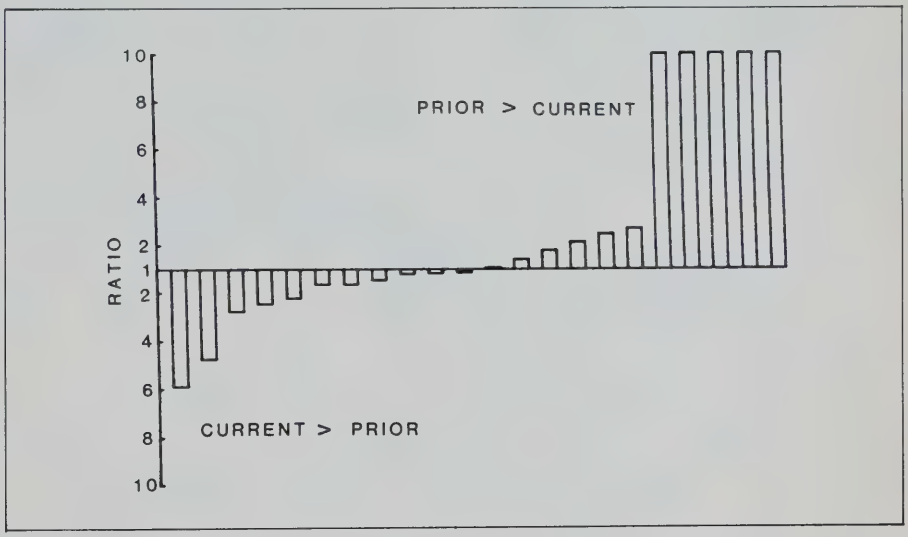

Fig. 11. *Composite distribution function of attachment level considering 3414 sites measured in 22 subjects. R^2 for fit to the exponental function is 0.92.*

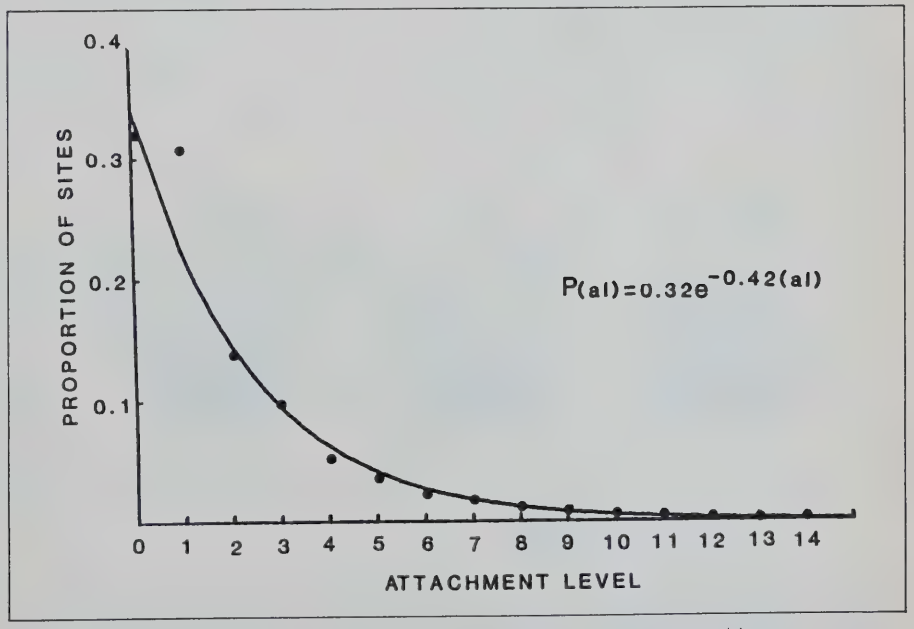

Fig. 12. *Comparison of prior and current disease activity. Twenty-two subjects are arranged in order of the ratio of (current rate/average rate) as described in Table 3.*

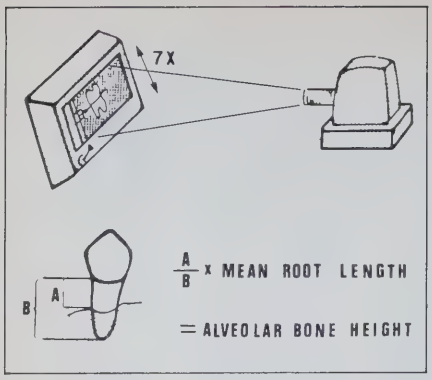

Fig. 14. Method of measurement of crestal bone height from standardized radiographs. The image distances from CEJ to alveolar crest (A) and CEJ to root tip (B) were measured on a 7X enlarged projected image. The ratio A/B times the mean root length was used to compute the alveolar bone height from the CEJ.

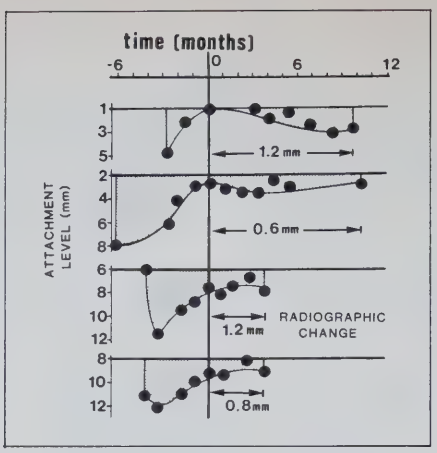

Fig. 15. Patterns of attachment level and bone loss at four periodontal sites. In each of the examples, significant bone loss (during the period indicated by arrows) was preceded by evidence of attachment loss.

DECISION MATRIX:

		DISEASE (BONE LOSS) PRESENT	ABSENT
TEST RESULTS (ATTACHMENT LOSS)	POSITIVE	a	c
	NEGATIVE	b	d

True positive ratio = TP = a/(a+b) = P(T+|D+)
= SENSITIVITY

False positive ratio = FP = c/(c+d) = P(T+|D−)

SPECIFICITY = 1 − FP

Fig. 16. Decision matrix used to test the ability of attachment loss to predict bone loss. Considering attachment loss as the test and bone loss as the disease (or condition to be predicted), parameters were computed as defined.

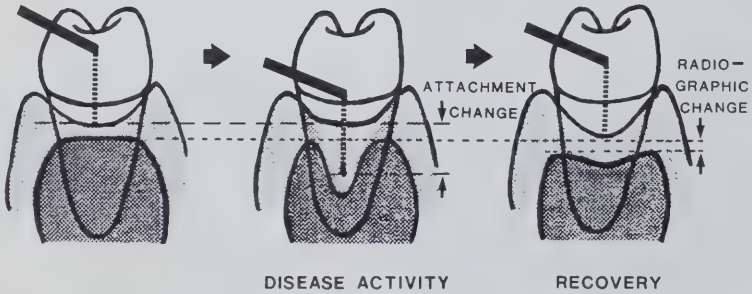

Fig. 17. Relationship between attachment level and radiographic changes in a periodontal disease activity cycle. Disease activity results in increased attachment loss and associated bone loss. However, crestal bone height does not change until the cortical bone remodels.

III. The occurrence of A would predict B with high probability.

Point I is indicated by the observations illustrated in **Figure 15**. Point II is indicated by the observation discussed in relation to **Table 4**, that none of the sites losing bone were sites found "active" by attachment measurement. To test point III, the ability of attachment loss to predict bone loss, data were analyzed by forming a decision matrix (**Figure 16**). Considering the test to be attachment loss and the disease to be bone loss, several parameters were defined. The true positive ratio (sensitivity) was the probability that attachment loss occurred if bone loss occurred. The false positive ratio was the probability that attachment loss occurred when bone loss did not. The ratio of true positive to false positive (TP/FP), the likelihood ratio, was used as a measure of the ability of attachment loss to predict bone loss without incorrectly including sites where bone loss did not occur.

Data were evaluated for attachment loss measured prior to and coincident with radiographic bone loss (**Table 5**). As attachment loss cutoff values increased, the likelihood ratio increased rapidly for prior attachment loss measurement but changed little with coincident loss. This indicated that attachment loss measurements predicted **subsequent** bone loss, but not bone loss occurring at the same time. For example, a 4 mm attachment loss would have a 60 per cent probability of predicting subsequent loss with only a 5 per cent probability of incorrectly including sites where no bone loss would occur (**Table 5**). In contrast, the same loss with coincident measurement would result in a 20 per cent probability of predicting bone loss and a 15 per cent probability of including sites where no bone loss would occur.

A second observation associated with the relationship between attachment loss and bone loss was the difference in the magnitude of change in the two measures of periodontal disease destruction. Comparing a series of radiographic changes with attachment level changes measured at the same site, a major discrepancy appears (**Table 6**). The mean attachment level change was 4.5 mm; whereas, the mean change in crestal bone height was 0.8 mm. How can a 4.5 mm change in attachment level be related to an 0.8 mm change in bone loss? This question has been raised by other investigators,[14] but a satisfactory explanation has not been provided.

The explanation for this discrepancy could lie in the nature of the initial disease attack on bone. How does the early osseous lesion associated with active periodontal disease appear? Recently, a case history was reported suggesting that the early osseous lesion associated with attachment loss could

be the formation of a narrow channel into the medullary portion of the alveolar bone, a condition not indicated by clinical radiographic changes.[10] Similar observations have been made on skull specimens.[16] If this is the case, the early osseous lesion could be of a magnitude comparable to the attachment loss but undetectable by conventional radiography.

To summarize this series of related but discordant observations, a hypothesis has been suggested relating attachment level and bone loss changes (**Figure 17**).

By this model, disease activity is first detected clinically by an increase in probing depth. At that time, a bone lesion of comparable magnitude exists but is obscured from radiographic detection by the unaltered crestal bone plates. Later, as the lesion begins to heal, bone remodeling occurs, producing the small decrease in crestal bone height characteristic of radiographic changes associated with periodontal disease activity.

CONCLUSION

The central theme of this symposium is, "How do research findings influence clinical dentistry of the future?" An important contribution of these studies has been to define a concept of **episodic** periodontal disease activity. From this concept, the presence of a periodontal pocket does not necessarily indicate active disease, rather the historic result of disease. But new insight creates new dilemmas for both scientists and clinicians. To the scientist, the challenge is to associate observations with defined states of disease activity. To the clinician, the basis of successful therapy is questioned. Might success in therapy be related to sites that were not actively diseased in the first place? Likewise, might failure in therapy be related to active disease that was never resolved? The key to therapy of the future will be diagnosis of the active disease state. It will be important to know when to treat and when not to treat, and to know when treatment has been effective and when it has not. Each of these factors will depend on the ability to recognize the active periodontal disease state.

ACKNOWLEDGEMENTS

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TABLE 6

Comparison of radiographic change of crestal bone height with attachment level change at the same site.

Radiographic Change (mm)	Attachment Level Change (mm)
1.2	5.0
1.2	4.0
1.0	5.0
0.8	4.0
0.6	5.5
0.6	5.0
0.6	4.0
0.6	3.5
0.6	4.0
0.6	3.5
0.6	2.5
0.5	6.0
$\overline{X}$ = 0.8 mm	$\overline{X}$ = 4.5 mm

TABLE 5

Attachment loss as a predictor of bone loss. Values of true positive (TP), false positive (FP), and the likelihood ratio (TP/FP) were computed for attachment loss both prior to and coincident with radiographic bone loss. Only prior attachment loss measurements were related to high likelihood ratios.

ATTACHMENT LOSS CUTOFF (mm)	PRIOR TO RADIOGRAPHIC LOSS			COINCIDENT WITH RADIOGRAPHIC LOSS		
	TP RATIO	FP RATIO	TP/FP	TP RATIO	FP RATIO	TP/FP
1	0.8	0.76	1.05	0.9	0.93	0.97
2	0.7	0.42	1.67	0.8	0.53	1.51
3	0.6	0.19	3.16	0.5	0.28	1.79
4	0.6	0.05	12.0	0.2	0.15	1.33
5	0.4	0.01	40.0	0.2	0.10	2.00

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PATHOGENESIS OF PERIODONTAL DISEASE: NEW CONCEPTS

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ABSTRACT

The primary role of bacteria as etiologic agents for most forms of periodontal disease, and the critical modifying role of host responses to these pathogens has been elucidated by intensive study over the last few years. Based upon these findings, it is useful to consider several stages in the pathogenesis of periodontal disease: a) Colonization, b) Invasion, c) Destruction, and d) Healing, and to place into perspective the various host responses as they affect each of these four stages.

In the colonization stage, oral bacteria with periodontopathic potential adhere and grow at the orifice to the gingival crevice and proliferate apically into the advancing periodontal pocket. Host responses which modify colonization include antibodies, both serum and salivary derived, which inhibit or block adherence and colonization. Phagocytes, particularly neutrophils, appear to be important, acting in concert with opsonic antibody and complement in minimizing invasion of the tissue by periodontapathic organisms. It is clear that the virulence of periodontopathic bacteria relates in large part to their leukagressive properties, allowing them to evade neutrophil protective mechanisms, leading to invasion of the gingiva by the bacteria or their products. Invasion of the periodontal tissues is followed by destruction of the tissues, both by direct bacterial effects and by host-mediated events which are triggered by bacteria or their products. The host-mediated destructive effects result in part from activation of lymphocytes and macrophages, with production of biologically active mediators of inflammation such as osteoclast activating factor and macrophage collagenase.

It is clear from the longitudinal studies of periodontal disease that it does not progress at a constant rate, but lesions undergo cycles of tissue destruction. The tissue-destructive periods are followed by remission in which healing of the lesions occurs. The healing phase is characterized by reformation of the gingival epithelium and connective tissue, and remodeling of alveolar bony defects. The role of the host in the healing stage is largely unknown, although it is likely that the macrophage plays an important role.

Understanding bacterial and host factors operative at each proposed stage in the pathogenesis of periodontal disease can lead to alteration of these stages by therapeutic or preventive intervention through the future development of vaccines, anti-inflammatory agents, or drugs which enhance protective immunity.

SOMMAIRE

Au cours des dernières années, des études intensives ont permis de définir le rôle fondamental que jouent les bactéries comme agents étiologiques dans le développement de la plupart des maladies parodontaires, ainsi que le rôle critique que tient l'hôte en réagissant contre ces éléments pathogènes. Tout en s'appuyant sur les découvertes qui ont été faites, il convient de distinguer diverses phases dans la pathogénie des maladies parodontaires: a) la colonisation, b) l'invasion, c) la destruction, et d) la guérison. De plus, il importe de mettre en perspective les diverses réactions de l'hôte en autant qu'elles touchent à chacune de ces phases.

Durant la phase de colonisation, des bactéries buccales possédant des propriétés parodontopathiques adhèrent à l'ouverture des culs-de-sac gingivo-dentaires, s'y développent et s'y multiplient apicalement de manière à les envahir. L'hôte réagit en fabriquant, à partir du sérum et de la salive, des anticorps qui empêchent l'adhésion des bactéries et arrêtent la colonisation. Les phagocytes, neutrophiles surtout, semblent importants, agissant de concert avec les anticorps opsoniques, et contribuent à réduire l'invasion des tissus par des organismes parodontopathiques. Il est évident que la virulence des bactéries parodontopathiques dépend en grande partie de leurs propriétés leukoagressives qui leur permettent d'échapper aux mécanismes protecteurs des phagocytes neutrophiles. Il s'ensuit une invasion des gencives par les bactéries et leurs dérivés. L'invasion des tissus parodontaires entraîne leur destruction. Celle-ci est causée directement par les bactéries ainsi que par les activités intermédiaires que les bactéries et leurs dérivés déclenchent chez l'hôte. Ces activités sont dues en partie à l'activation des lymphocytes et des macrophages alliée à la production de médiateurs inflammatoires biologiquement actifs comme l'activité ostéoclastique et la collagénase macrophage.

Des études effectuées sur l'adhésion longitudinale ont démontré que la maladie ne se développe pas de façon progressive, mais que les lésions suivent des cycles de destruction tissulaire. Les périodes de destruction sont suivies de périodes de rémission au cours desquelles a lieu la guérison des lésions. Durant cette phase, l'épithélium gingival et les tissus conjonctifs se reconstituent et les défauts des alvéoles osseuses se corrigent.

TABLE 1

Specific Bacteria Associated with Various Forms of Periodontal Disease in Man[a]

Disease	Organism(s)
Adult Periodontitis	*Bacteroides gingivalis*
Localized Juvenile Periodontitis (Periodontosis)	*Actinobacillus actinomycetemcomitans, Capnocytophaga*
Periodontitis in Juvenile Diabetics	*Capnocytophaga, Actinobacillus actinomycetemcomitans*
Periodontitis in granulo-cytopenic hosts	*Capnocytophaga*
Gingivitis in pregnancy	*Bacteroides intermedius*
Acute Necrotizing Ulcerative Gingivitis	*Bacteroides intermedius*, intermediate-sized spirochetes

a) The organisms listed are prominent members of the lesion flora, have pathogenic potential, and in some instances their elimination from the lesions is associated with healing. For references see (1) (Slots and Genco, J. Dent. Res., 1984).

On ignore en grande partie le rôle que l'hôte joue alors, mais il est probable que la fonction des macrophages est essentielle.

C'est en comprenant ce que font les bactéries et les mécanismes de défense de l'hôte dans chaque phase de la pathogénie parodontaire qu'on peut arriver à modifier le progrès de la maladie. Pour ce faire, on pourra recourir à des moyens thérapeutiques ou préventifs comme la mise au point de vaccins d'agents anti-inflammatoires ou de drogues qui renforceront l'immunité protectrice des sujets.

INTRODUCTION

There have been marked advances in our understanding of the causes and subsequent progress of periodontal diseases. Numerous studies in the past two decades have led to the conclusion that the primary cause of gingivitis and the various forms of periodontitis is bacterial. The bacteria of dental plaques which accumulate at the gingival

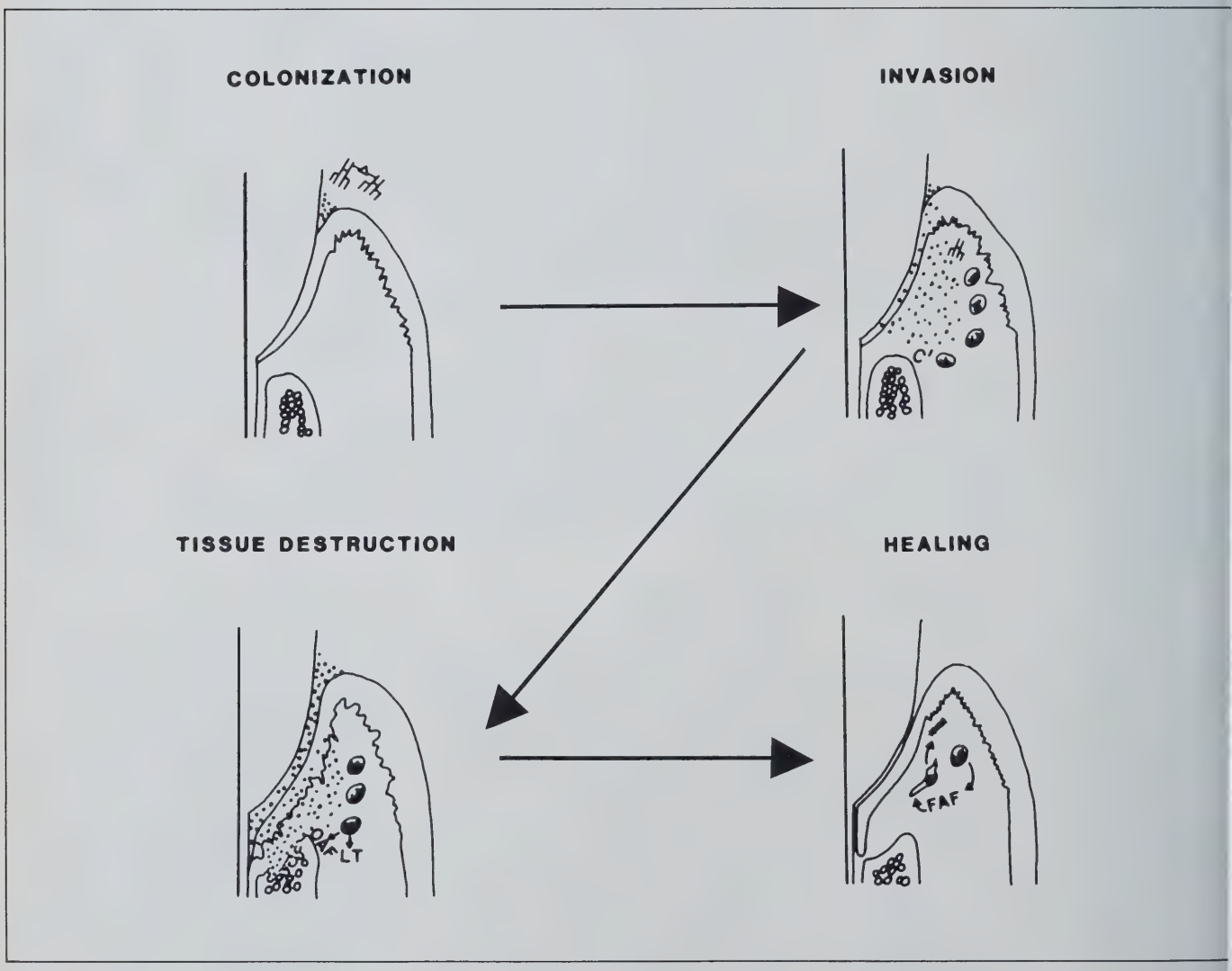

Fig. 1.

margin cause the early forms of gingivitis, and also possibly slow-moving periodontitis. On the other hand, unusual forms of gingivitis, and rapidly advancing forms of periodontal disease are associated with specific bacteria or combinations of bacteria found mainly in the subgingival microflora. Specific bacteria associated with various forms of periodontal disease are shown in **Table 1**, and data implicating these as etiologic agents are described in detail elsewhere (1,2). In adult periodontitis, especially the more advanced forms characterized by rapid vertical bone loss, there are large numbers of *Bacteroides gingivalis* found in the lesion flora. On the other hand, the juvenile form of periodontitis, particularly the localized juvenile form (periodontosis), is associated with *Actinobacillus actinomycetemcomitans* and *Capnocytophaga*. Periodontal lesions in patients with insulin-dependent (juvenile) diabetes mellitus are heavily infected with *Capnocytophaga*, and in some cases also *Actinobacillus actinomycetemcomitans*. The periodontitis found in granulocytopenic patients is associated with *Capnocytophaga*. Specific bacterial species are also found in various forms of gingivitis. In acute necrotizing ulcerative gingivitis *Bacteroides intermedius* and intermediate-sized spirochetes are prime candidates as etiologic factors, while in gingivitis associated with pregnancy, *Bacteroides intermedius* is prominent in the gingival flora. These organisms are not only prominent members of the lesion flora, but they all exhibit marked pathogenic potential[1]. Most of the periodontopathogens produce factors such as collagenase and endotoxin, which lead to destruction of the gingival connective tissue and surrounding alveolar bone. Further evidence that the periodontopathogens listed are truly causative agents comes from the finding that treatment directed to eliminating the specific organism has been effective in curing the form of periodontal disease in question.

Knowing which specific organisms are found in different forms of periodontal disease has been essential in understanding the host response to periodontal organisms. Many host responses are specific, since they involve the induction and action of antibodies or cellular immune reactions directed to specific bacterial antigens.

It is recognized that many of the specific bacteria associated with periodontal disease are gram-negative anaerobes which cause periodontal tissue destruction. It is important to note that they are also virulent when they enter the body and infect tissues other than the periodontal tissues. For example, *Antinobacillus actinomycetemcomitans* is found in actinomycotic lesions in association with *Actinomyces* species. *A. actinomycetemcomitans* also causes brain abscesses and subacute bacterial endocarditis. *Bacteroides gingivalis* is a serious pathogen which can cause brain abscesses, lung abscesses and dissecting infections of the head and neck which may be fatal. *Capnocytophaga* species have been implicated as causative agents in septicemias in patients who are immunocompromised by administration of cytotoxic drugs. Hence, it is clear that the local host response to these pathogens plays a major role in localizing these organisms to the gingiva, preventing their spread to other areas of the body where they may cause fulminating, and often fatal infections. The result of these host responses often is localized destruction of the gingiva and the alveolar bone supporting the teeth, which we known as periodontal disease. The net effect of host responses to the organisms causing periodontal infections however, is protection from systemic infection with these organisms.

Stages in the Pathogenesis of Human Periodontal Diseases

Recent advances in our understanding of the tissue changes and the host bacterial interactions occurring in periodontal diseases, led us to propose that there are several stages in the pathogenesis of periodontal diseases[1,2]. This scheme helps to organize information about the pathogenesis of periodontal disease, as well as to expose areas of incomplete knowledge. Perhaps most important, the division of the pathogenesis of periodontal disease into these operational stages may lead to approaches for intervention aimed at preventing or curing the diseases. The stages in the pathogenesis of human periodontal disease are: 1) Colonization, 2) Invasion, 3) Destruction, and 4) Healing. They are shown graphically in **Figure 1** and are discussed in detail elsewhere[2]. They will be briefly described here.

Colonization

Initially a salivary pellicle is deposited onto the enamel or cemental surface. This pellicle soon becomes colonized by organisms such as *Streptococcus sanguis* which binds both specifically and non-specifically to the pellicle-coated surface by adherence. In turn, other organisms bind to these initial plaque formers by coadherence. Coadherence may be intragenic, in which case cells of the same genus or species bind to each other, or intergenic in which cells of different microbial species bind to one another. Once attached to the tooth surface, organisms proliferate apically, which results from bacterial growth, and in part to migration. Gingival fluid contains growth factors as well as chemotactic factors which for example, direct spirochetes to migrate into the gingival crevice or the periodontal pocket. Similarly, the motility of other organisms allows them to migrate apically into the gingival crevice or periodontal pocket. Among the motile organisms found in the periodontal pocket are gliding organisms such as *Capnocytophaga*, and flagellated anaerobic vibrios.

Invasion

In the invasion stage, whole organisms and/or their products invade the gingiva through the sulcus or the pocket epithelium, and enter the connective tissue to a variable extent, even to the surface of the alveolar bone. Invasion of the gingival connective tissue by organisms has been reported in a case of localized juvenile periodontitis[3]. We showed that in ten of eleven gingiva biopsies taken from patients with localized juvenile periodontitis, *Actinobacillus actinomycetemcomitans* was demonstrated immunologically and ultrastructurally within the gingival connective tissue adjacent to infected periodontal pockets[4]. It is well known that bacteria, particularly spirochetes, invade the tissue in ANUG, and there are reports of bacterial invasion of the tissue in other forms of periodontal disease[2]. Invasion of the tissue by bacterial products is suggested by the systemic immune responses seen which are specific to organisms found in the subgingival flora. Bacterial antigens must penetrate or adhere to the tissues in order to induce an immune response. Since bacterial antigens penetrate the tissue, it is likely that other molecules such as collagenase and macromolecular toxins such as endotoxin, also enter gingival tissues.

Destruction

Once the organism or the products of the organism have penetrated the tissue, destruction ensues. There are two groups of mechanisms which account for this tissue destruction; direct effects of bacteria or their products, and indirect or host-mediated effects. Direct toxic effects such as those exerted by endotoxin, exotoxins or histolytic enzymes such as bacterial collagenase, lead to periodontal tissue destruction. In addition, host-mediated toxic products and reactions are triggered by bacterial components, which then lead to tissue destruction. An example of this is the triggering of macrophages to produce collagenase by endotoxins. Another example, is the triggering of cellular immune responses with local release of tissue-destroying lymphokines such as lymphotoxin which kills fibroblasts.

Healing

In the fourth stage, resolution of inflammation and healing of the periodontal

TABLE 2

Principal Components of Immune Systems Affecting Periodontal Infections

System	Main Function(s) in Periodontal Diseases	Cells	Humoral Components	Mediators
Secretory Immune	Reduce bacterial colonization of mucosal surfaces	Mucosal-associated lymphoid tissues (eg. Peyer's Patch) and local IgA-plasma cells	Secretory antibodies, mainly s IgA	–
Neutrophil, Antibody, Complement	Bactericidal, also secretory, producing extracellular enzymes and reactive oxygen species	Neutrophils	IgG antibodies; complement, especially C3	Bactericidal activity, mediated by reactive oxygen species, and granule components
Lymphocyte, Macrophage, Lymphokine	Tissue destruction	T- and B-effector cells, macrophages and monocytes	–	Lymphokines (L.T., O.A.F., Il1, Il2), macrophage enzymes (eg. collagenase), and reactive oxygen species

tissues occurs. Very little is known about this stage, however, it is clear from histopathologic and clinical studies that periodontal disease is episodic, going through periods of remission and exacerbation. Periods of remission are characterized by reduction of inflammation, restoration of gingival collagenous tissues, and gingival fibrosis. Changes in the alveolar bony contours with the formation of radiographically apparent sclerotic linings of infrabony pockets, and restitution of alveolar crestal cortical structures also occurs during remission, suggesting that healing has occurred. These clinically and radiographically apparent changes reflect healing of a periodontal lesion in remission.

Although four distinct stages in the pathogenesis of periodontal disease can be described, the time sequence of these stages is complex. Colonization must precede all other stages, but tissue invasion and tissue destruction may occur together. Tissue invasion may be transient, immediately preceding the tissue destructive phase, but tissue invasion may continue, resulting in progression of the periodontal lesion. The healing stage is clearly distinct from both colonization and the tissue invasion, and terminates tissue destruction.

Components of the Immune System Which Are Operative in Each Stage of Periodontal Disease

Components of the immune system which have been shown to be operative in one or another of these stages in the pathogenesis of periodontal disease are listed in **Table 2**. They include the secretory immune system, the antibody-neutrophil-complement axis, and the lymphocyte-macrophage-lymphokine axis. Other systems such as IgE-mediated immediate hypersensitivity, and immunoregulatory systems also may play a role in periodontal disease, but at the present time very little information is available to evaluate their role.

The secretory immune system consists of mucosal-associated lymphoid tissues such as Peyer's Patches and local IgA-containing cells. IgA antibodies formed by this system appear as the prominent antibodies in secretions which bathe mucosal surfaces. The neutrophil-antibody-complement system is comprised of the phagocytic blood and tissue neutrophilic polymorphonuclear granulocytes. These cells are highly mobile and large numbers migrate from the gingival blood vessels through the gingival connective tissue and epithelium into the gingival crevice or periodontal pockets, and finally into the oral cavity. Ninety-five percent of the cells found in the gingival fluid are neutrophils. The neutrophil phagocytoses and kills organisms and hence, regulates the ingress of these organisms into the tissue. The neutrophil acts in concert with IgC or IgM antibodies and complement. The IgG antibody coats the organism and the IgG-coated organism then binds to neutrophil surface receptors for the Fc portion of IgG. This enhances phagocytosis. IgM, and to some extent IgG, antibodies may also coat the organisms, and when this occurs the coated organisms bind components of the complement system, particularly the third component of complement (C3). There is a receptor for a fragment of C3 called C3b on the neutrophil, which is then engaged resulting in enhanced phagocytosis of the complement-coated particle. The antibody-complement-coated bacteria is phagocytosed very efficiently as compared to uncoated bacteria. Once the bacteria is phagocytosed by the neutrophil, it can be killed by oxidative or non-oxidative mechanisms. The oxidative mechanisms involve the activity of reactive oxygen species such as hydrogen peroxide, the superoxide ion, and possibly hydroxyl radicals. The hydrogen peroxide effects are inhibited by catalase, produced either by the organism or the neutrophil. Hydrogen peroxide-dependent killing is enhanced by myeloperoxidase, which in the presence of chloride, forms the hypochlorous ion which is highly antimicrobial, and is the same ion that exerts antimicrobial effects in chlorinated water. Non-oxidative mechanisms result from the action of neutrophil components such as lysozyme, lactoferrin and cathepsins which kill organisms directly in the absence of oxygen, and would be expected to be important in relatively anaerobic environments such as periodontal pockets.

The lymphocyte-macrophage-lymphokine axis consists mainly of effector T-lymphocytes which exert a variety of functions, which includes killing of target cells. T-helper and T-suppressor lymphocytes regulate both T-effector cell activity and production of antibodies by B-lymphocytes. Macrophages function as antigen-processing and antigen-presenting cells and can also act as effector cells by production of substances such as collagenase. Macrophages are subject to control by the products of T-lymphocytes. Lymphocytes when stimulated, either specifically by antigens or nonspecifically by mitogens such as lipopolysaccharide, produce highly active substances called lymphokines such as Interleukin 2. One of these lymphokines, osteoclast activating factor, can stimulate bone resorption, while others such as

lymphotoxin, lead to fibroblast killing. In addition, the stimulated macrophages secrete a lymphokine Interleukin I, as well as enzymes and reactive-oxygen species which cause tissue destruction.

Host Responses Which Are Operative in the Various Stages of the Pathogenesis of Periodontal Disease

In **Table 3**, the stages of periodontal disease are depicted and important host responses summarized for each stage. In the bacterial colonization stage, it is clear that antibody-mediated inhibition of adherence may play a decisive role in determining which organisms colonize the gingival margin and eventually become a part of the subgingival microflora. Antibodies of the secretory IgA class can be expected to exert effects on the early colonizing organisms. Later in the presence of gingival inflammation, gingival fluid antibodies, which are serum-derived as well as locally produced, can be expected to inhibit colonization of the subgingival area by periodontopathic organisms. Antibodies exert their effect on colonization by inhibiting adherence or coadherence of organisms, leading to aggregation and clearing into the gastrointestinal tract, or removal by phagocytosis.

The neutrophil-antibody-complement axis is thought to exert a protective role against the periodontopathogens, primarily through its ability to limit tissue invasion by the organisms. There is considerable evidence that neutrophils are important in protecting against the periodontal microflora. For example, patients with compromised neutrophil numbers or neutrophil function, such as those with agranulocytosis, the Chediak-Higashi Syndrome, or diabetes, are known to have severe periodontal disease[5]. Furthermore, in severe forms of periodontal disease in juveniles, such as localized juvenile periodontitis, neutrophil chemotaxis is depressed[6]. Periodontopathic organisms often have virulence factors which allow them to evade neutrophil protective mechanisms[1]. It appears that in the absence of the neutrophil, periodontopathic organisms, or their products invade the tissue at a much greater rate. Hence under normal circumstances the neutrophils and their accessory factors, antibodies and complement, are likely to exert protective effects in preventing or limiting invasion of the tissue by periodontopathic bacteria.

The lymphocyte-macrophage-lymphokine axis on the other hand, has a potential to exert marked pathologic effects, and may contribute to the loss of periodontal tissues seen in the destructive phase. Lymphocytes activated by antigens or mitogens of the periodontopathic bacteria, can stimulate the production of tissue-destroying lymphokines such as lymphotoxin which kills fibroblasts, and osteoclast activating factor which leads to bone resorption[2]. Stimulation of macrophages either by bacterial products or by the lymphokine Interleukin-2, results in the production of collagenase, which leads to dissolution of tissue collagen. Furthermore, stimulation of macrophages by lymphokines or bacterial products can lead to production of reactive-oxygen species which are toxic to local cells. The potential then is clear for the lymphocyte-macrophage axis to exert pathogenic effects when stimulated by invading organisms or their products.

The role of host responses in the healing stage of periodontal disease is largely unknown, however, certain speculations can be made. It is reasonable that for remission and healing of a periodontal lesion to occur the organisms and their products must largely be removed from the tissues. Tissue macrophages may play a role as scavengers in removing organisms, as well as in removing damaged tissue components. In addition, it is clear that there are lymphokines such as fibroblast activating factor which may stimulate the production of collagen and proliferation of fibroblasts leading to regeneration of gingival and periodontal ligament collagen, and eventually gingival fibrosis which often characterizes the healing stage.

TABLE 3

Host Responses Operative in Each Stage in the Pathogenesis of Periodontal Diseases

Stage of Disease	Host Factors
Colonization	Antibody-mediated inhibition of adherence; sIgA, and gingival fluid antibodies prevent adherence and coadherence.
Invasion	Neutrophil chemotaxis, phagocytosis, and bactericidal activity, with opsonic effects of antibody and C' protect against periodontal infections. Macrophage bactericidal activity and extracellular killing may also be protective.
Destruction	a. Toxic effects on tissues of lymphocytes and macrophages exerted via lymphokines, and toxic macrophage products such as collagenase and reactive oxygen species. b. Direct toxic effects of bacteria controlled by antibodies which neutralize toxins and enzymes.
Healing	a. Lymphocytes and macrophages produce fibroblast chemotactic factors and fibroblast activating factors which result in repair of connective tissue and epithelium. b. Bacteria and bacterial products removed by phagocytes.

CONCLUSION

Great progress has been made in our understanding of the pathogenesis of periodontal disease, the primary role of bacterial etiologic agents, and the critical modifying role of host responses. In the absence of moderation of the virulence of periodontopathic organisms by the host, these organisms produce serious fulminating systemic infections. However, it is also clear that the periodontium is often destroyed in the fight to protect the host from systemic infections with periodontopathic organisms. Intervention at critical stages in the pathogenesis of periodontal disease will be possible when more information is available. For example, vaccines which prevent colonization or enhance phagocytosis, anti-inflammatory agents which block tissue-destroying mechanisms, or drugs that enhance protective functions all hold promise for future therapy and prevention.

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EKTASPEED AND A SCREEN/FILM SYSTEM COMPARED WITH ULTRA-SPEED IN THE INTERPRETATION OF EARLY PROXIMAL CARIES

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ABSTRACT

The study compared the diagnostic value of Ektaspeed and a screen/film system (Siemens Titan 2D/Kodak XG) with the current standard, Kodak Ultra-Speed. The evaluation of enamel caries in extracted teeth was chosen to provide an exacting trial of the test films. Statistical analyses showed that both films had excellent specificity and high sensitivity. These results indicated that Ektaspeed and the screen/film system were as reliable as Ultra-Speed in the disclosure of enamel caries. If used as an alternative to Ultra-Speed, both films offer significant reduction in radiation exposure to patients.

SOMMAIRE

Voici un article qui compare la valeur diagnostique de deux pellicules photographiques, Ektaspeed et Siemens Titan 2D/Kodak XG, à celle de la pellicule ordinaire Kodak Ultra-Speed. Pour les besoins de la comparaison, on a choisi de photographier des caries apparaissant dans l'émail de dents déjà extraites. L'étude des statistiques a révélé que les deux premières pellicules sont très sensibles et très précises et que, pour repérer des caries, elles sont tout aussi efficaces que la pellicule Ultra-Speed. Utilisées à la place de cette dernière, elles présentent en outre l'avantage d'exposer les patients à un taux de radiation plus bas.

INTRODUCTION

A study of the development of both medical and dental radiography discloses a dilemma created by the conflict between two important objectives. The first objective and the prime purpose of radiography is the production of an image which will reveal the essential information obtainable by this method of examination. The second objective is to do so by the most efficient use of radiation and thus keep patient and operator exposure to a minimum.

The need for reducing exposure was apparent within a very few years of the introduction of x-ray examinations. Pioneer radiologists suffered disastrous consequences from overexposure to the invisible rays of yet unknown properties. Recognition of the hazards to professional users was soon accompanied by concern for the potential hazard to the patient from even small amounts of radiation. While collimation, filtration and higher kilovoltages were to effect substantial reductions in patient exposure, the most significant reduction in medicine was produced by the use of intensifying screens. Recent advances in screen technology have resulted in screen/film systems which require only a fraction of the radiation of the direct-exposure films used in dentistry and in the traditional screen/film systems[1]. Although the screen image does not have the pleasing visual qualities of direct-exposure film, it is quite satisfactory for virtually all diagnostic needs in medical practice. The somewhat degraded image is an acceptable exchange for major reductions in patient exposure.

In dentistry, where direct-exposure film is the *only film used* for periapical and bitewing radiography, the use of increasingly faster emulsions has been one of the major means of radiation reduction. **Table I** illustrates the evolution of faster direct-exposure film emulsions. The quality of the image, as measured by sharpness and contrast,

TABLE I

Evolution of Kodak Intraoral Film

Trade name	Year introduced	A.N.S.I. speed group	Relative emulsion speed
Regular	1920	A	1
Radia-Tized	1939	B	2
Ultra-Speed	1941	C	4
Radia-Tized	1955	C	4
Ultra-Speed	1955	D	8
Ektaspeed	1981	E	16

deteriorated with each increase in film speed. These faster films required accommodation by the viewer to the degraded image. Direct-exposure films are made "faster" (require less radiation to obtain an image of equivalent density) by increasing the size of the silver grains in the emulsion. Compared with the exceptionally clear and visually attractive image of the early film, the graininess of the Ultra-Speed film created an impression of poor quality, due to the reduction in image sharpness and contrast. These visible changes led to considerable doubt about the wisdom of using the fast film for the fine detail required of dental radiography. In spite of widespread concern about the quality of the image for diagnosis, by 1969 Speed D film accounted for over 90 per cent of film sales. Production of all slower film emulsions was discontinued in the early 1970's. No scientific evidence was presented which showed that the reduced image quality of faster film was detrimental to the fundamental purpose of the x-ray examination.

The profession eventually overcame dislike and mistrust of the Speed D film and it became the standard. In 1980, Eastman Kodak introduced Ektaspeed, a Speed E direct-exposure film requiring 50 per cent less radiation than Ultra-Speed. As in the past, the increase in film speed is likely due to an increase in the size of the silver halide grains. The inevitable consequence of this is a further increase in graininess with an attendant loss of sharpness and contrast.

Does the unavoidable degradation of image quality in fast film merely represent a loss of aesthetic appeal or is there an actual reduction in the diagnostic value of the radiograph? This question has recurred at every introduction of faster direct-exposure film and screen/film systems. In an attempt to address the question as it applies to the most recent introduction of fast film, this study compares the Ektaspeed image with that of Ultra-Speed in the evaluation of a range of early carious lesions. These images represent one of the more exacting tests of the radiograph as an examination method. Recent studies[2-4] have explored the possibility of an intraoral role for screen film which, if acceptable, would produce exceptional reductions in radiation exposure. Because of the encouraging results of these studies, the use of such a screen/film system was included in the comparison with the two direct-exposure films.

METHOD

Recent studies have convincingly demonstrated the limitations of the radiograph in caries examination.[5-7] Various anatomic images and certain physical defects can be perceived by the examiner as pathologic an that results in sound surfaces being recorde as carious. Many subsurface lesions, whic are clinically visible as white or brown spots will not appear in the radiograph. Whe images of early enamel lesions do appear the radiograph does not distinguish betwee those with cavitation and those with intac enamel surfaces. Since the purpose of th study was to evaluate the reliability of tw test films and not to reaffirm the limitation of Ultra-Speed, it was essential to provid images on Ultra-Speed which were *know* to represent both sound surfaces and earl carious cavities. This critical preconditio necessitated an *in vitro* study using care fully selected extracted teeth.

Selection of Teeth:

Molar and premolar teeth were chosen b the following visual criteria; they shoul have no restorations, hypoplastic defects fractured enamel in the contact area, exten sive occlusal caries or any anatomic varian which might simulate caries. Those teet with brown or white proximal discoloration without cavitation were excluded. Eac acceptable tooth was examined with a 16 dissecting microscope to assure the pre sence of a cavity. A smaller number of teet with sound surfaces also were selected During the entire selection process and sub sequent radiography, the teeth were pro tected from desiccation. Gross accretions c calculus which might alter the radiographi image of caries were removed, but care wa taken to avoid physical contact with th proximal surface. All the teeth were the radiographed with Ultra-Speed using th same technical factors later employed in th study (**Table II**). Each image was cate gorized according to the set of radiologic cri teria in **Table III**. Only those teeth whic satisfied all visual and radiologic criteri were included in the test. From these teeth 75 surfaces were selected for the test; eac examiner was allotted 25 surfaces with a equal number of R_1 and R_2 and somewha fewer R_0 images for interpretation.

Radiographic Method

To approximate *in vivo* conditions, th teeth were arranged in groups of three, wit contact areas in natural alignment. Th roots were positioned within speciall designed plastic moulds which were use to make the plaster blocks. Each test bloc was assigned a permanent number whic was engraved on a metallic tag and em bedded in the plaster. The tags were locate remote from the crowns so that the per manent block number appeared on th lower part of each radiograph. The exam iners were not able to see this when the film were placed in the light-excluding mounts These blocks fit precisely into a devic

TABLE II

Technique Data

Film	Screen	Time (impulses)	kVp	mA	Source/ film(cm)	Generator
Kodak DF58	none	120				
Kodak EP-21	none	60	70	10	40	S.S. White Spacemaker
Kodak DFG-5	Siemens Titan 2D*	10				90 long-beam tube

*terbium activated lanthanum oxybromide.

TABLE III

Radiological Diagnostic Criteria

Class	Description
R_0	Sound enamel with no evidence of radiolucency
R_1	A definite radiolucency, usually cone-shaped, lying in the outer half of the enamel although the leading edge or point may extend into the mid-zone. There is a *wide zone* of *normal enamel* separating the lesion from the enamel-dentine junction.
R_2	A deeper, wider radiolucency which may lie close to or touch or extend slightly beyond the enamel-dentine junction i.e. the images *cluster around* the junction.

lesigned to obtain reproduceable radiographs (**Figs. 1 and 2**). It was constructed o ensure a fixed object-film distance, a ight-angle projection to both object and ilm, and a fixed source-film distance. The levice permitted film changes without alterng the exact position of the tube and test lock. The dental film carrier could be completely removed and replaced by the cassette when exposing the screen film. The plane of the dental film was identical to the plane of the film within the cassette. A tissue-equivalent material was interposed in the beam to approximate the absorption and scatter of x-rays by human tissue. A sheet of lead foil was fixed to the back of the cassette to absorb back scatter in a manner similar to the intraoral packet.

The desired density for the Ultra-Speed film was chosen by the examiners after reviewing a selection of clinical films. The exposure times for the two test films were calculated and tested to achieve an equivalent density for the three films. Radiographs of each block were then made with the three films. The technical data are shown in **Table II**.

All films were processed manually using the Kodak GBX developer and fixer. A four-tank process was used, *viz.* developer, stop bath, fixer and running water. The films were immersed in Kodak Photo-Flo solution before air-drying in a cabinet at room temperature. The manufacturer's recommendations with respect to time, temperature, agitation and safe-lighting were scrupulously observed[8]. The processing was done approximately three hours after exposure in order to minimize any effects due to latent-image instability. The silver halide crystals are more stable for a period of between 30 minutes and eight hours after exposure[9]. The developer was matured or seasoned by processing 30 square inches of exposed film. Seasoning ensures that images will not be affected by chemical fog to the extent that might occur in freshly mixed developer[9].

Training and Testing of Examiners

The three examiners discussed the radiological criteria (**Table III**) and studied their applicability by examining radiographs showing appropriate images of sound and carious surfaces. Following this training session, each examiner independently interpreted 30 proximal surfaces in a set of radiographs. There was an equal number of R_1 and R_2 images but fewer sound surfaces, a pattern to be used in the actual study. The radiographs selected to measure inter-observer reliability were Ultra-Speed films from clinical patients' charts. The radiographs were framed with light-excluding cardboard and examined at 2X magnification in a dimly lit viewing room. During this trial and the rest of the study, the examiners were protected from distraction or interruption. The results were subjected to statistical analysis to determine inter-examiner reliability. The level of reliability was sufficient to permit pooling of the experimental data from each examiner.

Method of Assessing Test Films

Since bias could be introduced if the examiners selected or radiographed the test material, all such preparation including numbering, mounting and assignment of radiographs to the examiners was done by the research assistants. Each examiner evaluated three series of radiographs (Ektaspeed, screen film and Ultra-Speed) of the 25 preselected surfaces allotted to him. The block identification number was hidden from the examiner's view by the cardboard mount. Each mounted radiograph was assigned a random three-digit identification number. The Ultra-Speed series was identified so this could be examined last. The Ektaspeed and screen film series were not identified nor was the examiner instructed as to which of these to examine first. All radiographs in a series were examined and results recorded before proceeding with the next series. In an attempt to eliminate recognition of patterns or individual images, films of each series were examined in a previously arranged random order. The evaluation of all radiographs was done in the same room, under conditions identical to those described for the training test. Each examiner recorded his results for each series of radiographs on a separate form. Cross-referencing was not permitted. The results were subjected

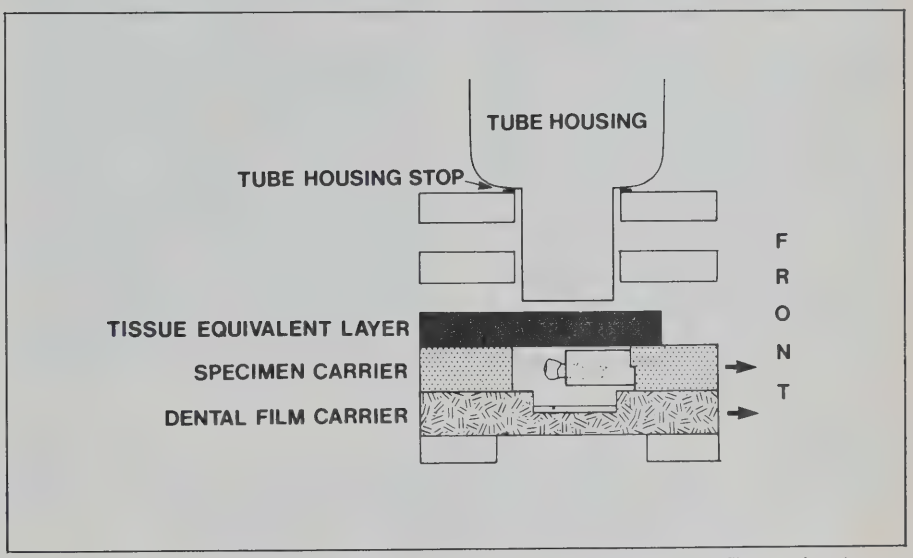

Fig. 1. *The device used to obtain reproduceable radiographs. The dental film carrier shown is replaced by the cassette when screen film is exposed. The middle section of the tissue-equivalent layer has been cut away in the sketch to reveal the well in the movable specimen carrier.*

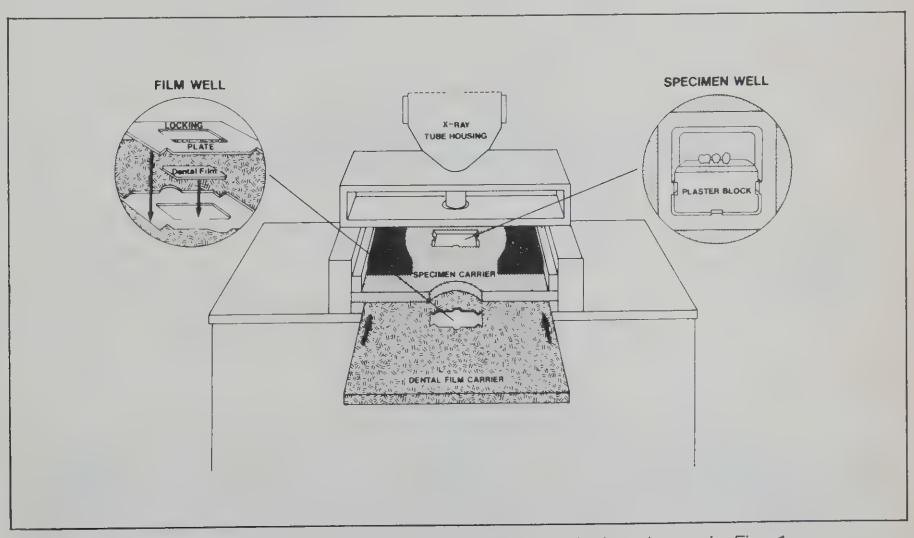

Fig. 2. *A cross-section of the functional elements of the device shown in Fig. 1.*

to statistical analysis. Kappa* statistics were computed to assess the overall agreement between methods (i.e. Ultra-Speed, Ektaspeed and screen film) on the three-point scale (R_0, R_1, R_2). In addition, the sensitivity and specificity were calculated relative to the standard; for these analyses, a two-point scale (R_0 vs. $R_1 + R_2$, i.e. sound vs. carious) was adopted as the most relevant classification scheme.

RESULTS

To derive a composite measure of agreement between the standard and each test film across all three categories (R_0, R_1, and R_2), an overall kappa statistic was computed by combining the three independent estimates provided by each examiner. This was justified, since the three separate values of kappa were found to be very similar. Using the procedure proposed by Fleiss,[10] the overall value of kappa was 0.89 for agreement between the screen film and the standard and 0.85 for agreement between Ektaspeed and the standard. Since values of kappa greater than 0.75 may be taken to represent excellent agreement,[10] this analysis indicates that each film type gives ratings on the three-point scale that are very similar to those given by Ultra-Speed.

*Kappa is a statistical measure of association which indicates the degree of agreement between distinct rating methods above that expected by chance. If there is complete agreement between methods, kappa equals 1.0. If there is no agreement above that expected by chance, kappa equals 0.

Sensitivity and specificity were calculated for the data from each examiner. Again, since results were very similar, the data were pooled. It is seen from the results, shown in **Table IV**, that both test films have excellent specificity (1.00) and extremely high sensitivity. The screen film has a somewhat lower sensitivity (0.96) than Ektaspeed (1.00).

DISCUSSION

The high kappa values for the test films compared to Ultra-Speed show that each film had excellent agreement with the standard across the three image categories. Using the test films, the observers were able to distinguish between sound surfaces and the two levels of enamel lesions with equal facility. It had been anticipated that Ektaspeed might be capable of making this distinction. However, the fact that the screen film also had this capability was unexpected since this system had not been used previously in such a role. We anticipated that the screen film, with its lack of image sharpness, would be capable of making the cruder differentiation between R_0 and R_2 but would not show sufficient detail to allow for the finer discrimination necessary to separate the individual levels on the three point-scale.

Sensitivity is defined as the proportion of abnormal items correctly classified by a test method. In this study, the sensitivity of both the screen film and Ektaspeed was extremely high. The screen film was slightly less sensitive, as the observers recorded two lesions as sound surfaces; in both cases these were R_1 images as recorded by the Ultra-Speed. In no instance did either test film differ with Ultra-Speed in the recording of R_0 or R_2 images. The slight numerical difference between the test films probably has no clinical significance.

Specificity is the proportion of normal items correctly classified. The test films agreed with Ultra-Speed in every instance. In no case was a sound surface recorded as carious.

In practice, the R_1 category of enamel caries presents particular problems to the clinician. Less than 30 per cent of these images represents the cavitation stage of caries,[5-7] which is an important criterion for restoration. The remainder are subsurface lesions that have the potential of remineralization if a program of preventive treatment is instituted.[11] Restoration of all teeth that manifest R_1 lesions would constitute significant over-treatment.[6] Therefore, these subsurface lesions are not restored unless there are symptoms or other overriding clinical factors. Based upon this clinical consideration, the data were regrouped so that R_0 and R_1 images represented the normal (not indicated for treatment) and the R_2 the abnormal (**Table V**). Both the Ektaspeed and the screen film had slightly lower sensitivities when the data were grouped this way. This is explained by the few instances where the test films downgraded R_2 images to R_1. Although the test films showed a slight tendency to under-detect carious images, it is very unlikely that this would lead to under-treatment since the radiographic examination is only adjunctive to clinical evidence. On the other hand, the specificities of the two test films (0.96) were very high, i.e. they were able to detect the sound images almost perfectly. Thus, over-treatment is no more likely than would occur with the standard.

The Ultra-Speed image is aesthetically more attractive than either of the test films. The direct-exposure Ektaspeed has slightly less film contrast[8] and image sharpness than the Ultra-Speed. Both of these characteristics are a direct consequence of using the larger grain size to increase film speed. The screen film image is obviously less sharp than either of the direct-exposure films. This is an expected characteristic of the screen/film system and is primarily caused by the size of the crystals in the fluorescent coating on the screen. The screen film, however, has a significantly higher contrast than either of the direct-exposure films.[12] If the only criterion for film selection were image sharpness, examiners would prefer the slower to the faster direct-exposure film and any direct-exposure film over the screen type. How-

TABLE IV

Sensitivity and Specificity of Two Test Films

COMPARISON OF ULTRA-SPEED WITH EKTASPEED IMAGES

Ektaspeed Classification of Images			
$R_1 + R_2$	51	0	
R_0	0	24	
	$(51, R_1+R_2)$	$(24, R_0)$	
	TOTAL ULTRA-SPEED IMAGES		

Sensitivity* $= \frac{51}{51} = 1.0$

Specificity** $= \frac{24}{24} = 1.0$

COMPARISON OF ULTRA-SPEED WITH SCREEN FILM IMAGES

Screen Film Classification of Images			
$R_1 + R_2$	49	0	
R_0	2	24	
	$(51, R_1+R_2)$	$(24, R_0)$	
	TOTAL ULTRA-SPEED IMAGES		

Sensitivity* $= \frac{49}{51} = .96$

Specificity** $= \frac{24}{24} = 1.0$

* Sensitivity is the proportion of images classified as $R_1 + R_2$ by the standard (Ultra-Speed) correctly classified as $R_1 + R_2$ by the test film.

** Specificity is the proportion of images classified as R_0 by the standard (Ultra-Speed) correctly classified as R_0 by the test film.

ever, in the final analysis the value of a radiograph is dependent on its ability to record the detail essential to the diagnostic problem while expending the least amount of radiation. In this study, the aesthetics of a film was not a criterion in judging its diagnostic value. In spite of the degraded image, each of the test films was essentially similar to the standard by the measures of sensitivity and specificity. The Speed D film used as the standard in the study is the customary film in practice. However, its use does not imply that the images observed represent the true presence or extent of disease. To replace the standard, an alternative film must be equally discriminatory and offer some additional benefit to the patient or the profession.

This study indicates that Ektaspeed film could safely supplant the Ultra-Speed film for the interproximal examination of caries. Since most of our radiographic indications do not require this degree of image definition, Ektaspeed could be safely recommended for broader application. If, as suggested, the film is an acceptable alternative to Ultra-Speed, there would be a significant benefit to the patient of a 50 per cent reduction in radiation exposure.

Screen/film systems are vastly more radiation efficient than are the direct-exposure films. The slow system used in this study required less than 10 per cent of the exposure for Ultra-Speed. The application of screen film for intraoral use has been demonstrated in both *in vitro*[4] and patient trials.[2,3,13] However, before these film systems can be made available for clinical application, major advances are needed in cassette technology and cost reduction in the faster rare earth screens. The encouraging results of this study should give impetus to further evaluation of intensifying screens for intraoral use.

CONCLUSIONS

1. Ektaspeed and the screen/film system, Titan 2D/Kodak XG, were as reliable as Ultra-Speed in the disclosure of carious lesions in enamel.
2. The sensitivity of both Ektaspeed and the screen film was extremely high. The test films were identical to Ultra-Speed in specificity.
3. The results of this *in vitro* study suggest that Ektaspeed is an acceptable alternative to Ultra-Speed. Although the results indicate that the screen/film system also was acceptable, it is not a practical alternative in the absence of an intraoral periapical cassette.
4. If used as an alternative to the standard (Ultra-Speed), either film would offer the benefit of significant reduction in radiation exposure to patients.

The authors thank Mr. P.C. Wright, a senior dental student, for his assistance in the laboratory phase of the study. Also, we thank Dr. R.J. Wainright for his assistance in preparing the data and especially for the design and fabrication of the device to obtain reproduceable radiographs.

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TABLE V

Sensitivity and Specificity of Two Test Films

COMPARISON OF ULTRA-SPEED WITH EKTASPEED IMAGES

Ektaspeed Classification of Images	(30, R_2)	(45, R_0+R_1)	
R_2	24	2	Sensitivity* $= \frac{24}{30} = .80$
$R_0 + R_1$	6	43	Specificity** $= \frac{43}{45} = .96$

TOTAL ULTRA-SPEED IMAGES

COMPARISON OF ULTRA-SPEED WITH SCREEN FILM IMAGES

Screen Film Classification of Images	(30, R_2)	(45, R_0+R_1)	
R_2	27	2	Sensitivity* $= \frac{27}{30} = .90$
$R_0 + R_1$	3	43	Specificity** $= \frac{43}{45} = .96$

TOTAL ULTRA-SPEED IMAGES

* Sensitivity is the proportion of images classified as R_2 by the standard (Ultra-Speed) correctly classified as R_2 by the test film.

** Specificity is the proportion of images classified as $R_0 + R_1$ by the standard (Ultra-Speed) correctly classified as $R_0 + R_1$ by the test film.

THE ALARA CONCEPT

POPULATION EXPOSURES FROM X RAYS IN DENTISTRY – AS LOW AS REASONABLY ACHIEVABLE?

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ABSTRACT

During the past decade guidelines have been recommended by regulatory agencies to keep radiation exposure "As Low As Reasonably Achievable" (ALARA). The ALARA concept as it applies to rectangular collimation is introduced and applied to the dental profession to determine the cost-benefit of modifying a radiographic operation to incorporate new techniques and equipment. A dollar figure is needed as a limiting value in the cost-benefit analysis to reduce radiation doses to the public while at the same time not adding excessive expense to the dental profession.

SOMMAIRE

Durant la dernière décennie, les autorités ont recommandé de réduire l'exposition aux radiations au niveau le plus bas qu'il est raisonnablement possible d'atteindre (as low as reasonably achievable – ALARA). Voici une explication du principe ALARA tel qu'il vaut pour la collimation rectangulaire et tel qu'il s'applique à la profession dentaire pour déterminer le rendement obtenu en modifiant une opération radiographique pour y inclure de nouvelles techniques et de nouveaux dispositifs. Dans cette analyse de rendement, il convient d'exprimer en dollars les valeurs limitatives en vue de réduire les doses de radiation sans grever le budget des dentistes.

INTRODUCTION

Radiation doses to the public has become an increasing concern over the past ten years not only in the production of commercial nuclear electric power but also in medicine and dentistry. Conservative policies have been adopted by agencies such as the U.S. Nuclear Regulatory Commission (NRC), the Canadian Atomic Energy Commission, and U.S. Environmental Protection Agency, to keep radiation exposures "As Low As Reasonably Achievable" (ALARA)[1]. The ALARA concept promotes full use of new technology to reduce radiation doses to the public. The nuclear power industry is required[2] to purchase equipment to reduce radiation dose to the public if the cost of this equipment is less than $10 per person-sievert. That is, if the cost of equipment which can reduce doses to a population of people by one person-sievert, is less than $10 then the operator shall incorporate such equipment into the design of the power plant[3]. The question which this paper addresses is: how can the ALARA concept be adopted by the dental profession to reduce radiation burdens to the population at a minimum expense.

The ALARA Concept

Governmental policies which regulate radiation doses to patients in the medical and dental practices are sparce. Although guidelines have been developed by the Bureau of Radiological Health to minimize unnecessary or unwarrented radiation exposures, these recommendations are generally not mandatory and would be difficult to enforce. The guidelines[4] are based on information obtained from observing the diagnostic use of x rays in dentistry and medicine[5,6] and examining potential controls which could be applied without compromising benefits of the radiological procedure.

The report of the NAS-NRC Committee on Biological Effects of Radiation[7] was issued in 1973 and among its significant findings was that "medical (dental) diagnostic radiology accounts for at least 90% of the total man-made radiation dose to which the U.S. population is exposed". The Committee recommended that medical/dental exposure can and should be reduced considerably by limiting its use to clinically indicated procedures and utilizing efficient exposure techniques and optimal operation of radiation equipment.

The International Commission on Radiological Protection (ICRP), which was responsible for originating the ALARA concept[8] has been functioning since 1928 and has given general guidance to the use of radiation sources throughout the world.

The ICRP, in 1971, asked one of its subcommittees to prepare a report clarifying the implications of the ALARA principle so that the judgement of a profession would not be used to interpret the concept. The explanation given was to keep all radiation exposures as far below the limiting values as can be achieved.

The report[1] was issued and dealt with two specific considerations in determining levels of exposure that may be considered "as low as reasonably achievable". These considerations were economic and social and ethical considerations were included in the term "social".

The report maintained that three requirements must be met in implementing a system of dose limitation:

1) it should insure compliance with the Maximum Permissible Dose Limits recommended previously by the Commission.
2) it should result in the avoidance of doses from unnecessary exposures.
3) it should result in doses low enough to satisfy both of two interrelated conditions:
   a) the doses should be as low as is reasonably achievable, economic and social considerations being taken into account.
   b) the doses should be justifiable by the expected benefits of the procedures.

The report noted that this system of dose limitation was intended as a basis for the design and operation associated with controlled radiation sources leading to exposures.

APPLICATION OF THE ALARA CONCEPT

The analysis of comparing the importance of costs to health from the exposure to radiation involves highly-subjective economic and social judgements. These judgements should reflect the views of the profession membership who are affected. In order to quantify both benefits and costs, crude numerical values must be applied to intangible factors such as the cost to health in dollars of deterimental biological effects from radiation doses.

This has been done in the nuclear power profession[3] and monetary values of avoiding the detriment possibly associated with a population dose have been published and fall within a range of $0.10-$2.50 per person-sievert[1]. If these values are used in general cost-benefit analysis involving the equation from the ALARA guidelines[1]:

$$B = V-P-S-D \quad (1)$$

the net benefit, B. of a new product or changing an operation involving exposure to ionizing radiation can be determined. In this equation, V is the gross value, P is the basic production cost, S is the cost, including social costs, of achieving a selected level of safety, and D is a term representing the total deteriment represented by the use of the product.

For a particular operation or product involving radiation exposure, the assumption can be made that V and P are constant; then S and D can be chosen to maximize the benefit, B. This maximum is achieved when the sum S + D is a minimum. Figure 1 shows graphically the relationship of optimizing the benefit.

If, for example, a radiographic operation is changed in such a way as to reduce exposure to a population, E, the optimum benefit is given when:

$$\frac{dS}{dE} = \frac{-dD}{dE} \quad (2)$$

This condition is reached when the cost of achieving the next increment of reduction in E is larger than the value of the resulting reduction in detriment. This point is reached when any further reduction in risk would not justify the effort or expense required to achieve it. Therefore, this point represents ALARA (dotted line in Figure 1).

ADOPTION OF ALARA CONCEPT

The ALARA concept applied to the dental profession would limit the use of radiation to clinically indicated procedures while utilizing efficient exposure techniques and optimizing the operation of radiation equipment.

The cost-benefit analysis could be used by

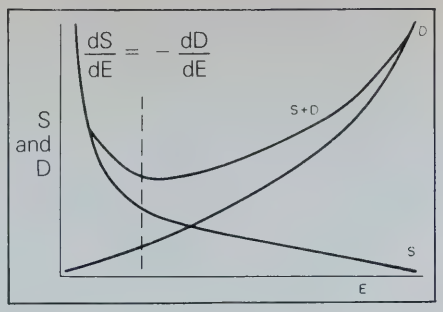

Fig. 1. Differential cost-benefit analysis. E = a variable reflecting the exposure, possibly in man-rems, S = total cost of achieving a value of E, D = total cost of detriment associated with a value of E.

recommendation councils, such as the Council on Dental Materials and Devices, to determine the net benefit of modifying a radiographic operation. For example, the net benefit of changing from circular to rectangular collimation could be evaluated in the following manner:

The estimate of detriment, D, expressed in monetary terms for avoiding a whole body dose of one person-sievert is assumed to be $1.20 (a value mid-way between $0.10-$2.50).

The amount of tissue being irradiated can be reduced by as much as 58% using a rectangular beam[9] the size of dental film.

The cost, S, of achieving a 58% reduction in the dose is approximately $75 per rectangular collimator (personal communication: Rinn Corporation, Elgin, Ill).

Based on an equivalent whole body dose to marrow of 0.15 millisievert from a 21 film full mouth series (FMS),[10] the dose, using rectangular collimation could be reduced approximately 0.09 millisievert. This is a reduction of detriment, to a population of one million people receiving FMS, of 65 sievert.

The estimated cost to the dental profession for rectangular collimators to make one million FMS and reduce the population radiation burden by 65 sievert is approximately $3800*. This is a cost of approximately $0.02 per person-sievert.

RESULTS OF ADOPTING ALARA

As indicated in the preceding section, the cost of equipment to reduce the dose to a population of one million people by one person-sievert using rectangular collimation, is approximately 2 cents. The question which the dental profession has to consider, if the ALARA concept is adopted, is what dollar figure should be used as a limiting value to indicate whether equipment should or should not be purchased by its membership?

The nuclear power industry uses a figure of $10 per person-sievert as their limiting value to reduce radiation doses to the public. If this figure is acceptable to the nuclear power profession should it not be adopted as a limiting value for medical and dental professions?

*Assuming $75/rectangular collimator; one collimator per dentist; one dentist making 1000 FMS/year[11], or 20,000 FMS/dental career=266 FMS per dollar spent on rectangular collimation.

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PRECISE SELECTIVE ANAESTHESIA

USING A PRESSURE SYRINGE

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ABSTRACT

A case is presented in which localization of diffuse dental pain was achieved using selective anaesthesia. This was accomplished by intraligamentary injection using a pressure syringe.

SOMMAIRE

Voici un cas dans lequel on a réussi à repérer le siège d'une douleur diffuse au moyen d'une anesthésie sélective réalisée par une injection intraligamentaire avec une seringue à pression.

INTRODUCTION

Despite signs, symptoms and clinical tests, diagnosis is often based on intuition or on an educated guess. At times the source of dental pain is indeterminable by standard methods. When exhaustive testing fails to isolate the origins of diffuse pain we treat the most likely tooth or hope that localization will occur with time.

Selective anaesthesia is a useful test which often permits differentiation.[1,2] It can be used to determine whether pain is originating from the mandible or maxilla. However isolated anaesthesia of adjacent teeth in the same arch may be difficult. Small deposits of anaesthetic around the root apices of a suspected tooth may be inadequate to perfuse alveolar bone and block nerve conduction. The use of larger amounts of anaesthetic may effect the nerve supply of neighboring, uninvolved teeth.

The following case illustrates the use of highly specific localized anaesthesia for the diagnosis of endodontic pain.

CASE

A 21-year-old female university student sought treatment for severe discomfort diffusely localized to the maxillary left quadrant. The pain had grown in intensity and duration over the previous ten days and was now constant. Non-prescription analgesics were of little use for relief. Despite obvious fatigue and tearful discomfort, the patient co-operated through a thorough evaluation.

Signs included the presence of large restorations in close proximity to the pulps of teeth # 2.4, 2.5, and 2.6 (**Fig. 1**). Vertical bone loss was measured, revealing pocket depths of from two to six millimetres. Tooth 2.5 exhibited Class III mobility and was in supra-occlusion. Radiographs taken from various angles revealed widened periodontal ligament spaces around the root apices of all three teeth.

All teeth were responsive to electric pulp testing. Repeated thermal tests with hot gutta percha, ice and dry-ice were non-discriminatory as were percussion, palpation and bite tests.

It was decided to selectively anaesthetize tooth 2.4 first and progress posteriorily. A pressure syringe* (**Fig. 2,3**) was used to deposit approximately 0.4 cc of anaesthetic

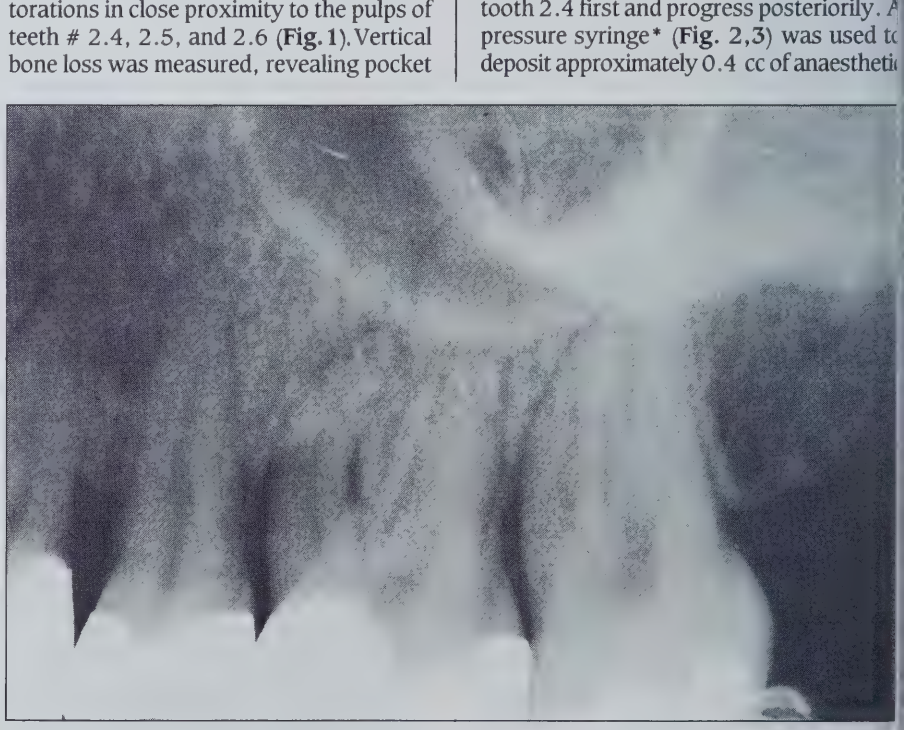

Figure 1. *Deep restorations, widened PDL and periodontal bone loss involve several teeth. Radiographs were of little value in isolating the source of pain.*

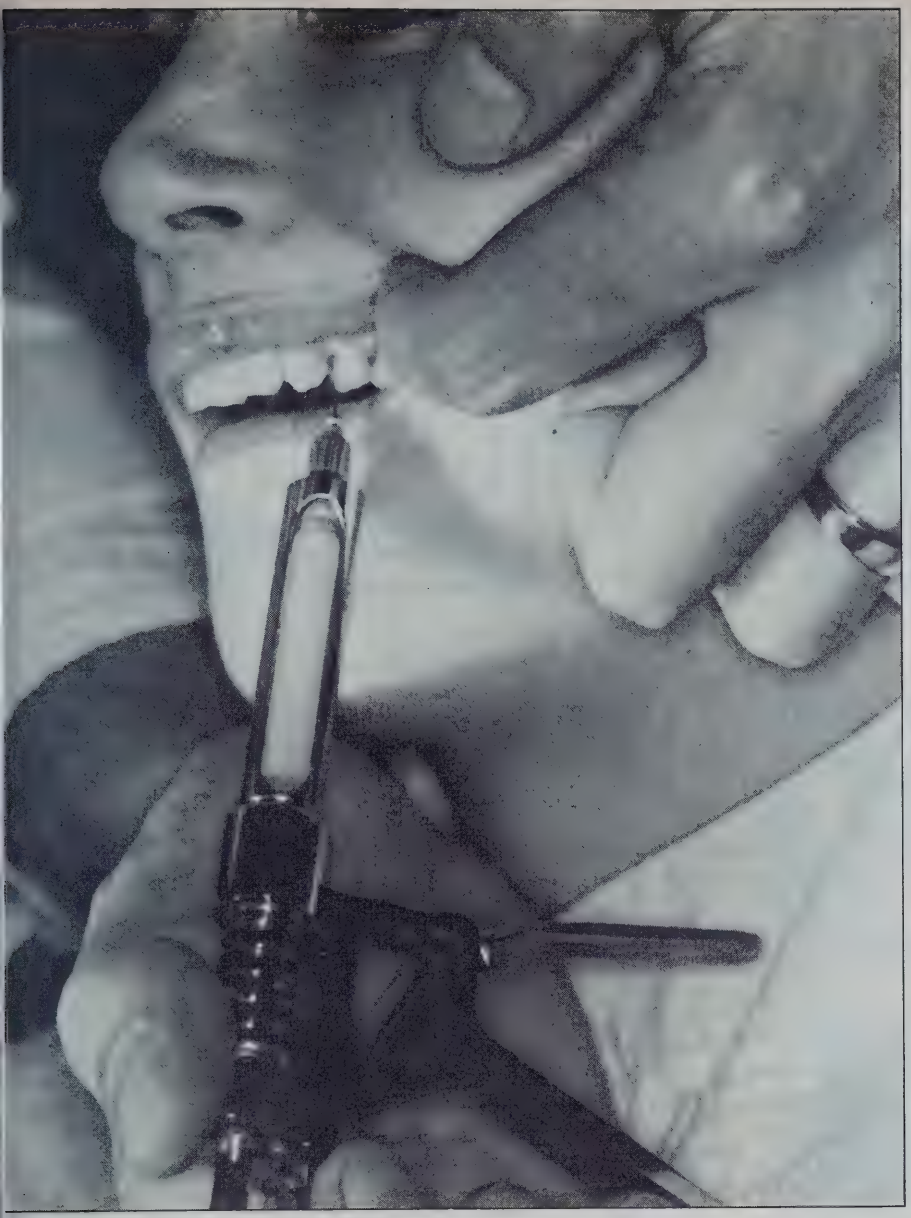

Figure 2. *Intraligamentary anaesthesia was accomplished using a pressure syringe.*

Figure 3. *The positioning of the needle in the proximal periodontal ligament space is illustrated.*

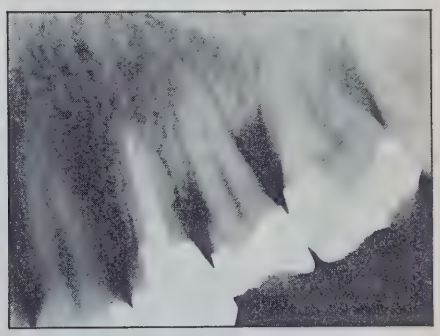

Figure 4. *Endodontic treatment completed on tooth 2.4.*

via the periodontal ligament space to the root apices.[3] Within 30 seconds the patient's pain dramatically and completely disappeared. Dry-ice then elicited no response from the anaesthetized tooth while adjacent teeth responded normally.

A diagnosis of acute irreversible pulpitis was made. Following pulpectomy, the patient remained totally asymptomatic. Tooth 2.5 was reduced from occlusion. Endodontic treatment was completed (**Fig. 4**) and periodontal therapy is in progress.

DISCUSSION

Selective anaesthesia using a pressure syringe was effective and led to specific localization of the origin of pain. Had an uninvolved tooth been selectively anaesthetized first, the involved tooth would have continued to ache. This technique can be used, if need be, to systematically eliminate teeth from consideration as a source of pain. Confirmation of a suspected tooth can be quickly ascertained with the pressure syringe.

SUMMARY

A case report is presented in which highly selective anaesthesia using a pressure syringe was used to isolate the source of diffuse dental pain. When the evaluation of signs and symptoms are inadequate to reveal the source of dental pain, intraligamentary anaesthesia using a pressure syringe is a valuable aid to diagnosis.

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Harold Gerstein, DDS. *(Illinois) Professor and Chairman of Endodontics Department; Director of Dental Graduate Studies at Marquette Dental School, Milwaukee, WI.*

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Announcements

MAY/MAI

May 11-12: Continuing Education Course: Periodontal-prosthodontics with Dr. Ralph Yuodelis, Edmonton, Alberta. Contact: Triple G. Dental Seminars, 11223 76th Avenue, Edmonton, Alberta, T6G 0K2, 403-439-0218 or 403-433-9773.

May 11-12: A course entitled "Fundamentals of Selecting and Using Computers in a Small Dental/Medical Practice" is being held at Northwestern University, Chicago, Ill. Fee of $240 U.S. includes all lunches and course materials, includes 13 hours of AGD or ADA credit for dentists. Contact: Northwestern University, College of Continuing Professional Education, 339 E. Chicago Ave., Chicago, Ill. 60611.

May 13-16: Ontario Dental Association 117th Annual spring meeting. The Sheraton Centre, Toronto, Ontario. Contact: Mrs. A. M. Durham, 234 St. George St., Toronto, Ont., M5R 2P1, 416-922-3900.

May 15: University of Toronto, Faculty of Dentistry, Class of '54 holding its 30th reunion, Trillium Room, Ontario Place, Toronto, Ontario. Contact: Dr. Wayne H. Tester, 305 Glendale Avenue, St. Catharines, Ontario, L2T 2L6, 416-227-7007 for information.

May 31-June 1: 12th Annual meeting of the Canadian Society for Color in Art, Industry and Science, Auditorium of the Montreal Museum of Fine Arts, Montreal, Quebec. Keynote speaker is Dr. Steven Bergen, Chief of Dental Service, Manhattan Veteran Administration, Medical Service, New York. Contact: Dr. Peter Kaiser, York University, Dept. of Psychology, 416-667-6335.

JUNE/JUIN

June 3-5: Alberta Dental Association Convention, Banff Alberta, Banff Springs Hotel. Contact: Drs. Wood or Zaharichuk, 3616 54th Ave., S.W., Calgary, Alta., T3E 5H4.

June 4-7: International Association of Oral Pathologists general meeting, Noordwijkerhout, The Netherlands. Contact: Congress Secretariat, 2nd meeting of the International Association of Oral Pathologists, c/o Mrs. R. Mooijen, AZVU, Pathologisch Instituut, De Boelelaan, 1117, MB Amsterdam, The Netherlands.

June 8: Dental Horizons Inc are presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice", Einstein, New York. Contact: Dr. L. Zucker, 3201 Grand Concourse, The Bronx, New York, 10468, 212-933-5510.

June 8th-9th: The Diagnosis and Treatment of Cranio-facial pain presented by Dr. Parker Mahan from the University of Florida and the L.D. Pankey Institute, at the Portman Intercontinental Hotel, London, England. Contact the Course Secretary, The Old Bothy, Norwood Hill, near Horley, Surrey RH6 OHP, England.

June 10-16: XIII Biennial Conference on Dental Research and Education, University of Manitoba, Winnipeg, Manitoba. Contact: The Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man.

June 10-16: The Association of Canadian Faculties of Dentistry is holding its annual meeting, Gull Harbour, Becla Island, Manitoba. Contact: Dr. Lindsay Gibson, University of Manitoba, Faculty of Dentistry, 780 Bannatyne Ave., Winnipeg, Man., R3E 0W3.

June 14-17: 104th Annual Meeting of the British Dental Association in association with the 3rd International Quintessence Symposium and the 2nd International Symposium on ceramics, Barbican Centre, London, England. Contact: The British Dental Association, 64 Wimpole St., London, England, W1M 8AL.

June 19-22: The 6th International Conference on Periodontal Research, Kibbutz Shefaim, Israel. Contact: The Sixth International Conference on Periodontal Research, P.O. Box 394, Tel Aviv, 61003, Israel.

June 21-24: The International Congress of Oral Implantologists World Congress VII for Oral Implantology, Munich, West Germany. Munich Sheraton Hotel. Contact: Clifford J. Kirschner, Executive Director, The International Congress of Oral Implantologists, P.O. Box 2277, Grand Central Station, New York, New York, 10163, 201-783-6300.

June 22-23: Third Annual Symposium for Sports Dentistry, Boyne Highlands Resort, northern Lower Michigan. Contact: Dr. W. C. Godwin, Dept. of Complete Denture Prosthodontics, University of Michigan Dental School, Ann Arbor, Michigan, USA 48109.

June 23-25: Florida Dental Association 1984 Florida Dental Congress. Buena Vista Palace, Lake Buena Vista, Orlando, Florida. Contact: Florida Dental Association, 3021 Swann Ave., Tampa Florida, 33609. 813-877-7597.

June 23-28: Yukon Dental Association presents Summer 84, continuing education seminar and escape. Combines lectures with a hike along the Chilkoot Trail. Contact: Dr. Frances Almstrom, 406 Lambert St., Whitehorse, Yukon, Y1A 1Z7, phone: 403-667-4486.

June 24-27: Canada Safety Council 16th Annual Safety Conference, Skyline and Delta Hotels, Ottawa, Ontario. Contact: The Canada Safety Council, 1765 St. Laurent Blvd., Ottawa, Ont. K1G 3V4, 613-521-6881.

JULY/JUILLET

July 1-6: Ninth Annual Congress of Dietetics, Toronto, Ontario. Hilton Harbour Castle Hotel. Continuing education credits will be assessed for both ADA and CDA registered dieticians. Contact: Congress Canada, Suite 603, 250 University Avenue, Toronto, Ont., 416-591-1498.

AUGUST/AOÛT

August 12-17: The New Zealand Dental Association is holding its biennial conference, Auckland, New Zealand. Contact: Dr. N. P. Ewart, Conference Secretary, P.O. Box 28085, Auckland 5, New Zealand.

August 13-23: International Association of Dental Students Congress, Israel. For information, contact either: Mr. Annibale

Coia, 12 Market Place, Carluke, Lanarkshire, M18, 4BP, Scotland or Congress Committee, Melia, P.O.B. 3109, 17 Gordon St., Tel-Aviv, Israel.

August 18-24: Canadian Society of Forensic Science 31st annual conference. Viscount Gort Flag Inn, Winnipeg, Manitoba. Contact: Executive Secretary, 613-235-7112 or write: Canadian Society of Forensic Science, 171 Nepean St., Suite 303, Ottawa, Ontario, K2P 0B4.

August 23-25: New Orleans Dental Conference, New Orleans, Louisiana, at the New Orleans Hilton Hotel. Part of the Louisiana World Exposition. Top clinicians are slated to take part. Contact: New Orleans Dental Conference, Suite 119, 3101 West Napoleon Ave., Metairie, LA., 70001, 504-834-6449.

August 25-31: 72nd Annual World Dental Congress of the FDI, Helsinki, Finland. Contact: FDI '84, Helsinki 8, SF 00100, Helsinki, 10, Finland.

SEPTEMBER/SEPTEMBRE

September 4-7: 7th Congress of the International Association of Dentistry for the Handicapped. Amsterdam, Holland. Contact: Mrs. Hongkie Tan, Brouwergracht, 210B, 1013 HD, Amsterdam, Netherlands.

September 9-15: McKay Sub-Branch of the Australian Dental Association will be hosting the North Queensland Dental Convention on Hayman Island. Contact: The Secretary, North Queensland Dental Convention, P.O. Box 838, MacKay, 4740, Australia.

September 14-16: The Canadian Academy of Endodontics twentieth annual meeting. Chateau Lake Louise, Lake Louise, Alberta. Contact: Dr. Carl Hawrish, 762-10830 Jasper Ave., Edmonton, Alta., T5J 2B3, 403-425-8930.

September 19-22: The American Academy of Periodontology annual meeting, Hilton Hotel, New Orleans, Louisiana. Contact: The American Academy of Periodontology, 211 E. Chicago Ave., Room 924, Chicago, Ill. 60611.

OCTOBER/OCTOBRE

October 1-3: American Equilibration Society Satellite Program, Hyatt Regency Hotel, Acapulco, Mexico. Contact: The American Equilibration Society, 8726 North Ferris Ave., Morton Grove, Illinois, 60053, 312-965-2888.

October 4-5: Eighth International Congress of Dental Technicians, Cologne, Germany. Contact: Messe-und Ausstellungs Ges. m.b.h., Koln, Messeplatz, Postfach 210760. D-5000, Koln, 21, Deutz.

October 18-20: The American Association of Public Health Dentistry 47th annual meeting, Atlanta, Georgia. Abstracts must be submitted by May 1, 1984 to: Dr. Myron Allukian, Program Chairman, 818 Harrison Ave., Boston, Mass. USA, 02118.

October 18-20: Canadian Academy of Prosthodontics Annual meeting, Toronto, Ontario. Contact: Dr. B.M. Jackson, 22-22 Water St., S. Kitchener, Ont., N2G 4K4.

October 18-20: Czechoslovak Congress on Stomatology, Congress Hall, Health Resort Island, in Piestany, Czechoslovakia. Contact: The Congress Secretariat, Slovak Medical Society, Mrs. V. Kralicova, Mickiewiczova, 18, 813 22 Bratslava, Czechoslovakia.

October 26-29: Annual meeting of the Pacific Dental Federation, MGM Grand Hotel, Las Vegas, Nevada, USA. Contact: Mr. Jack Small, Skyline Travel, 615 W. Hastings St., Vancouver, B.C., V6B 1M8, 604-685-6102.

October 28: Dental Horizons Inc. is presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice", Bronx New York. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, New York, 10468, 212-933-5510.

NOVEMBER/NOVEMBRE

November 4-7: A course entitled "Plating and Screw Osteosynthesis in Maxillo-facial Trauma, Reconstructive and Orthognathic Surgery" will be presented by the Department of Otolaryngology, State University of New York, Upstate Medical Centre, Syracuse, New York, at the Cloisters, Sea Island, Georgia. For registration contact: Ms. Andee Samartino, AO/ASIF Secretary, P.O. Box 514, Wayne, PA., 19087.

November 5-10: 11th Asian Pacific Dental Congress, Excelsior Hotel, Hong Kong. Contact: Congress Secretariat, International Conference Consultants, 57 Wyndham St., First Floor, Central, Hong Kong.

November 8-10: The International Conference on Oral Trauma, sponsored in part by the American Association of Endodontists. Registry Hotel, Dallas Texas. Contact: The American Association of Endodontists, 211 E. Chicago Avenue, Chicago Ill. USA 60611, or Dr. Paul Radman, 8226 Douglas, Suite 810, Dallas, Texas, 75225.

November 14-16: Scandinavia's largest international trade fair "Swedental '84" will be held in Stockholm, Sweden. Contact: Strusberg/Hewitt/Radley, U.S. representatives, 6671 Sunset Blvd., Suite 1525, Los Angeles, California, 90028, 213-462-6260.

November 22: The Toronto Academy of Dentistry Winter Clinic, Royal York Hotel, Toronto, Ontario. Contact the Academy, 234 St. George St., Toronto, Ont., M5R 2P2. 416-967-5649.

DECEMBER/DÉCEMBRE

December 1984: The Indian Dental Association's 39th annual conference, Bombay India. Contact: Dr. L. K. Ghandi, Conference Secretary, 39th IDA Conference, C-56, N.D.S.E., Part II, New Delhi, 10049.

1985+

January 1985: Second International Conference "Clinical Factors and Mechanisms Influencing Bone Growth", University of California, Los Angeles, Calif. Abstracts submitted no later than June 30, 1984. Contact: Andrew Dixon or Bernard Sarnat, Dental Research Institute, School of Dentistry, School of Medicine, Centre for Health Sciences, University of California, Los Angeles (UCLA), Los Angeles, California, 90024.

May 12-17, 1985: The 24th Australian Dental Congress will be held in Brisbane, Australia. The Congress is hosted by the Australian Dental Association. Contact: The Congress Secretariat, P.O. Box 29, Parkville, Vic., Australia 3052.

September 2-7, 1985. Fifth International Congress on Cleft Palate and Related Craniofacial Anomalies, Monte Carlo, Congress Centre. Contact: Chairman, Dr. Rene Malek, 6 rue Erlanger, 75016, Paris, France, or SOCFI, 14 rue Mandar, 75002, Paris, France.

September 21-27, 1985: The 73rd Annual World Dental Congress of the FDI, Belgrade Yugoslavia. Contact: Organizing Committee, 73rd FDI Congress, Sava Centar, Milentija, Popovica 9, 11070 Belgrade, Yugoslavia.

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ALBERTA—Calgary. Dental office and equipment for sale in excellent south shopping centre location. Shared premises with resultant low fixed overhead. Two operatories, hygiene room. Common lab, pan, storage, computer etc. Call (403) 271-2660 (office), (403) 278-9238 (home).

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ALBERTA—Banff. Looking for female dentist to build up children's practice. Two ideal locations, Banff, and a nearby community, Canmore. Associateship offered with option of partnership. For details phone Dr. S. Marin at 762-2179 or write to Box 1356, Banff, Alberta, T0L 0C0.

ALBERTA—Edmonton. Associate required from June 1, 1984. Contact: Dr. N. Manji at Center 104-5240 Calgary Trail, Edmonton, Alta., T6M 5G8, phone: 403-435-0182.

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ONTARIO—Winchester. Associate required for established associateship practice in Winchester, 30 miles south of Ottawa. Available immediately on a full or part-time basis. Possible partnership in practice for right individual. Contact: Dr. R.D. Wells, 613-774-2615 or write: P.O. Box 729, Winchester, Ontario, K0C 2K0.

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ADVERTISERS INDEX

Academy of General Dentistry 409
American Dental Association 406
Bask Computer Systems . . . 390
Block Drug. Co. 372
British Columbia Children's Hospital 352
C and B. Dental Laboratories 410
CDSPI 359, 370
Colgate Palmolive 355
Cooper Laboratories . . . . . IBC, ... OBC, 389, 396
Defense Nationale 414
Den Mat Corp. 369
Dept. of National Defense 368
East West Travel and Tour Corp. 388
Erta Inc. 352
General Motors of Canada 353
Johnson and Johnson 371
Kodak Canada 358
McNeil Consumer Products Co. 354, 379
Merck Frosst 360, 361
Premier Dental 388
Procter and Gamble Inc. . . . IFC
J. Vance Travel 387

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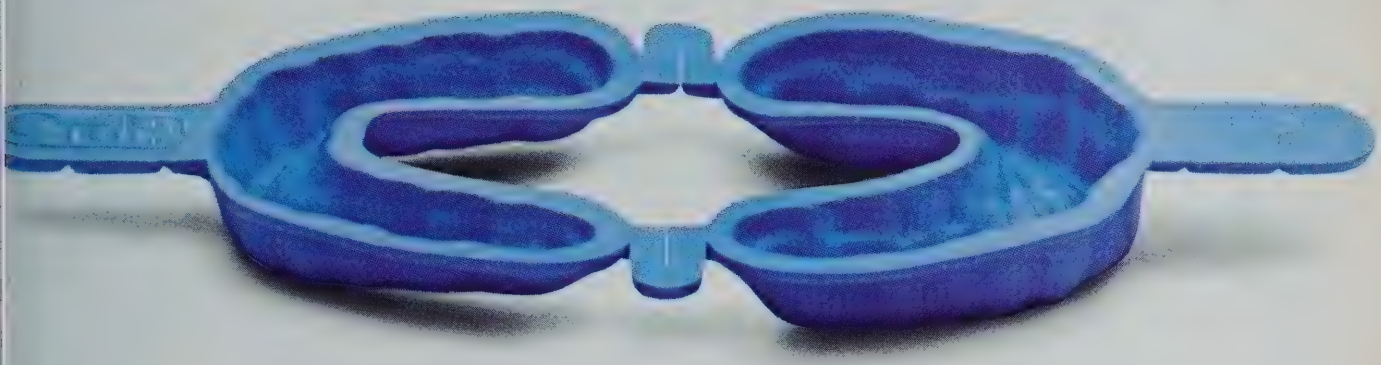

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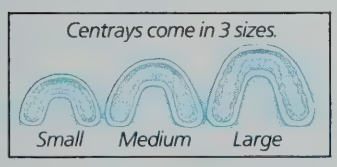

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June/juin 1984 Vol. 50 No. 6

JOURNAL

Canadian Dental Association / de l'Association Dentaire Canadienne

GUEST EDITORIAL 417

The guest editorial written by Dr. Judson Klooster, Dean of Loma Linda University dental school in California, deplores the dismal and gloomy outlook of many dentists. Optimism and confidence are much more in order in this profession, he says.

NEWS UPDATE 418

CDA-ODQ Conjoint Convention

The Convention made "April in Montréal" an April to remember. It was termed a highly successful event.

Executive Director's Report

CDA Executive Director Mr. Hubert E. Drouin, reports on major items considered at the Interim Board of Governors meeting in Montreal. The 1983 Financial Report of the CDA follows.

CDSPI Celebrates 25 Years

This year the CDSPI marks its 25th year of service to the dental profession in Canada.

Astronauts' Oral Health

BRIEFLY 434

Dental news items from across Canada and around the world.

LETTERS 439

British Columbia's Minister of Health, James A. Nielsen, replies to Dr. Wesley J. Dunn's article about the proposed British Columbia Medical Services Act which died on the order paper.

CDA RESOURCE CENTRE 442

A list of articles from the CDA Resource Centre/Library on the subject of Mouth Protectors

BOOK REVIEWS 443

ARTICLES 449

COMPUTERS AND THE DENTIST 449
Alan Veldman and Stephen Yolleck

COMPUTERIZED DENTISTRY IS PAINLESS 451
Dr. Donald Gutkin

A VIGNETTE–"THE FOREIGN LEGION" 455
By Jean Cives

DENTAL SEALANTS 461
National Institute of Health (U.S.) Statement

SCIENTIFIC 467

SYMPOSIUM 25 467

POSSIBILITIES FOR TREATING PERIODONTAL DISEASE AS SPECIFIC ANAEROBIC INFECTIONS 467
Dr. Walter J. Loesche

SPLINTING OF MOBILE TEETH USING LIGHT CURED COMPOSITE RESIN 473
Dr. D.H. Charles

CLINICAL EVALUATION OF COMPOSITE RESIN AND AMALGAM POSTERIOR RESTORATIONS 478
Dr. Gary D. Derkson et al

MARGINAL LEAKAGE OF DENTAL AMALGAMS 484
Dr. F. Fanian et al

PRÉVALENCE ET ÉVOLUTION DE FACTEURS DE RISQUE POSSIBLE POUR LA CARIE DENTAIRE 488
Dr Claire Infante-Rivard

CDA RRSP 436

OBITUARIES 444

ANNOUNCEMENTS 493

MARKETPLACE 495

ADVERTISERS' INDEX 496

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Guest Editorial

THE CONFIDENT PROFESSIONAL

Recently I had the opportunity of attending the new-member orientation seminar of a local dental society and visiting with several new members of our profession who are just developing new practices. Many of these are in heavily populated areas, where a high concentration of dentists and physicians has been traditional. I was delighted with the enthusiasm and "upbeat" optimism of these young professionals – they are meeting the challenge of the current marketplace with undiminished ideals in their quest for excellence as practicing dentists. Their attitude is not unusual, but rather it is typical of the buoyant and vigorous spirit of the younger members of our profession.

In recent months I have been dismally impressed with increase of dentists' gloomy comments and forecasting – it has become somewhat fashionable to express grave concern over the lack of business among dentists, the current increase in apparent competition among dentists for new patients or for business survival, and to engage in elaborate verbal handwringing over the sorry state of the economy. Unfortunately, some of these negative attitudes have been clearly read by patients in some dental offices. At a recent seminar, a young dentist remarked that in spite of the stringencies of the current economy, and whatever saturation there may be of the "dental marketplace," his practice is growing very nicely and that his patients greatly appreciate the positive personal interest he is showing in each of their needs. In effect, he said that "I am building my practice on the patients the older guys are scaring away with all their negative talk about "the future of dentistry". . .!

Patients really don't want to be treated by health professionals who seem to be operating in a failure mode, and who believe their profession is rapidly being spoiled. When the patient perceives the dentist to hold his/her profession in low esteem, we can hardly expect that person to have a higher attitude about dentistry than his/her dentist.

We may do our profession a tangible disservice by negative forecasting about the overcrowded manpower situation and other comments which might make it seem to our young listeners that perhaps dentistry can no longer be regarded as a desirable occupation. Indeed we may divert some of the most intelligent young people to other occupations by such negative forecasting; in doing so we jeopardize the future of our profession if we lose the best candidates to other fields.

In my opinion, the dental profession has a very secure future, one which can be enhanced by a positive spirit and a constructive approach to the complexities of modern life. Without question, our profession is changing rapidly – each day may present a new dilemma which tests our problem-solving resourcefulness. To cope successfully with these challenges is a satisfying experience – perhaps the fact that life isn't easy makes it all the more rewarding! Each of us must recognize that our professional training has opened many doors for each of us, given us new horizons and has broadened the dimensions of our service potential. Sometimes it is easy to forget how much this profession has enriched each of our lives.

Your editor has suggested that I should comment about how dental association members can be of assistance to the younger members of our profession. One way would be to involve them as associates in established practices. Last year, during his presidency of the ADA, Dr. Burt Press called attention to several advantages of taking an additional dentist into your own practice. Among these were the following points.

1. The fiscal value of your practice is immediately enhanced by taking an associate; in case of illness, death or retirement, these relationships open up several interesting approaches to short or long-term buy-ins or buy-outs, which can help to fund the retirement plan of the senior dentist and reduce his tax liability.
2. The involvement of younger partners or associates in your practice can help you change the character of your service patterns to patients, in order to remain competitive in these rapidly changing times. Sometimes this may be accomplished by expanding your office hours (without additional space or equipment) and making it possible to attract new patients whose time problems are of a higher priority than dental fees. Very often the younger associate will build a base of patients from differing sectors of the population, increasing the general level of referral to your practice and broadening the scope of your service.
3. The sharing of expenses and facility costs can lower your overhead.
4. You can increase your monthly income without practicing additional hours, or maintain the same income while working less. One can generate a new sense of excitement about dentistry by interaction with bright young professionals, and can find personal satisfaction and pride in guiding their early career development.

We are privileged to be members of this profession, to be responsible for solving its problems and guiding its continued development. Perhaps our skill in handling these problems will be enhanced if we regard each challenge as an opportunity, rather than retreating from it in exasperation or despair. Such is the spirit of our young colleagues – can those of us who have been longer associated with this profession, and have benefited more fully by our involvement, afford to be less optimistic?

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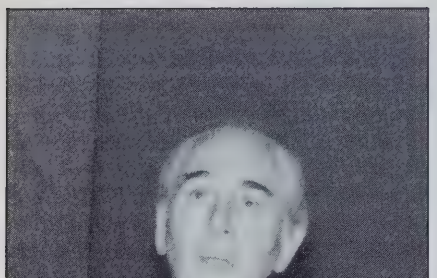
The foregoing was reprinted from the Newsletter of the Southern California Academy of General Dentistry with the written permission of the editor, Dr. Carl G. Lundgren, and the original author, Dr. Judson Klooster. It is an abbreviated version of an outstanding address originally delivered at a joint luncheon of the American Association of Dental Editors and the American Academy of the History of Dentistry last fall in Anaheim, California.



Dr. Gerald M. Kramer lectured on "Images of Comprehensive Dentistry" to a standing room only crowd on the opening day.

CDA-ODQ CONVENTION MAKES APRIL 1984 IN MONTREAL AN APRIL TO REMEMBER

April may have been the "cruelest month" to poet T.S. Eliot, but you couldn't have proved it by the number of delegates to the CDA-ODQ Conjoint Convention held April 10-12 in Montreal.

Held at the brand new and impressive Palais de Congrès, the conjoint convention attracted 2,300 dentists from across Canada, with large numbers of delegates registering on opening day. Combined with spouses, dental hygienists, dental assistants, exhibitors and special guests, the convention attracted more that 6,000 delegates over the three day period.

Beginning with huge crowds thronging the registration desks on the opening day and ending with the conjoint CDA-ODQ President's luncheon, featuring Quebec Premier René Lévesque, as the keynote speaker, the convention appeared to be regarded by all who attended as a resounding success.

Convention opened April 10

Although attendance at many of the scientific sessions was sparse during the morning of the first day of the convention, one session that was particularly well attended was Dr. Gerald M. Kramer's lecture on "Images of Comprehensive Dentistry: A Periodontist's Perspective".

Another unique feature of this year's convention was the "Pot Pourri Clinic", a short series of lectures given by different clinicians on various aspects of dentistry. The clinic, featuring different lecturers each day, ran throughout the convention. Some of the topics covered in Tuesday's sessions, held in the French language, were periodontic techniques by Dr. Jean Turgeon, fixed partial dentures by Dr. Louis-Philippe Lemay and current problems in oral surgery by Dr. Daniel Forget.

In addition to the scientific programs starting up in full swing on Tuesday, the Palais de Congrès' massive exhibit hall opened its doors to delegates early that morning. More than 130 exhibitors, occupying over 200 booths within the exhibition hall, had a steady stream of delegates visiting the displays daily. The Palais de Congrès itself was worth a trip, with its modern architecture tying together acres of glass and wide open spaces plunging several floors.

Scientific sessions were held in both official languages, with a full program and selection of speakers in both English and French. Such noted authorities as Drs. William Donohue, Pierre Desautels, Normand Brien and Thomas Graber spoke to capacity audiences throughout the convention.

Grieve Memorial Lecture

Dr. Thomas Graber, a noted orthodontist and authority on temporomandibular joint dysfunction syndrome was invited to deliver the George Wellington Grieve Memorial Lecture at the 1984 convention. The presentation marked Dr. Graber's 20th anniversary in association and attendance at CDA conventions. In 1964, Dr. Graber was asked to deliver his first Grieve Memorial Lecture to CDA delegates.

In his introduction to Dr. Graber's presentation, CDA President Dr. Robert N. Hicks noted Dr. Graber's impressive academic record and list of publications.

"Dr. Graber's achievements and academic papers published are simply too numerous to list before this audience," Dr. Hicks said.

Dr. Graber, currently director of Kenilworth Dental Research Foundation, (near Chicago) had a large and appreciative audience throughout his presentation which was co-sponsored by the Canadian Academy of Orthodontists. The title of the Grieve Memorial Lecture, the text of which will appear elsewhere in this issue, was "Diagnostic and Treatment Procedures for Temporomandibular Joint Dysfunction Syndrome."

Following his lecture, Dr. Graber was presented with a commemorative plaque marking the occasion, by CDA's President-elect, Dr. P. Ralph Crawford.

Social program

Although the weather in Montreal throughout the entire convention was nothing short of perfect, the traditional "Funn Runn' was cancelled early in the convention's planning stages because of insufficient registration.

However, the rest of the social and spouses' program highlights were many and varied and enjoyed to the full by those in attendance. Tuesday night's registration party entitled "April in Montreal" featured a hot and cold buffet and a floor show. Danielle Dorice and her "Doricettes" danced up a storm for the appreciative audience.

Dr. Donald Bentley, president of the American Dental Association, and an honoured guest at that function, made the observation that the "April in Montreal" presentation was "spectacular". Tuesday night was also an evening to remember for the dental assistants who could be seen dancing the night away to a string quartet.

Wednesday's highlights

Wednesday, April 11, the scientific sessions of the convention, in both English and French, were generally well attended, as delegates settled in. A comprehensive program for the "clinical pot pourri" was in full swing all day. Featured clinicians on Wednesday were Drs. Irwin Margolese, David Auerbach, Charles Dixter and Doksoo Ahn. The clinical pot pourri was presented entirely in English for the Wednesday scientific session.

One of the most popular lectures given on Wednesday was "Getting the Most out of Composite Resins" by Dr. Gerald Denehy. Illustrated by slides, as were many of this year's scientific sessions, Dr. Denehy's lecture attracted a standing room only audience. Another popular session was "Cardio-pulmonary Resuscitation" by Dr. Peter Vaktor. This session required reservations, to a maximum of 40, and Dr. Vaktor presented the course to a capacity crowd.

Table clinics successful

Another highly successful endeavour which took place on Wednesday, were the table clinics presented by both clinicians and student clinicians. Although somewhat late in opening, delegates streamed through the doors in record numbers when the sessions finally got underway.

Enthusiastic delegates attending the table clinic session included such prominent dental faculty deans as Dr. Arthur Schwartz, University of Manitoba, Dr. Gordon Thompson, University of Alberta and the Chairman of the Canadian Fund for Dental Education, Dr. David K. Peters.

Student clinicians and clinicians presented topics ranging from new endodontic techniques and composite resins to invisible orthodontics and eliminating accounts receivable. All table clinics were presented in either French or English.

President's Gala Evening

Wednesday's social highlight for Convention delegates was the President's Gala Evening, held at the opulent grand ballroom of Montreal's new Sheraton Hotel. Presidents and their spouses were very much in évidence. Attendees included Dr. Marc Boucher, President of the Ordre des Dentistes du Québec, Dr. Robert Hicks, President of the Canadian Dental Association, Dr. Donald Bentley, ADA President, Dr. Ralph Crawford, CDA President-elect and Dr. W.R. Thompson, CDA's immediate past-president.

The Gala started with pre-dinner entertainment by a musical ensemble of Suzanne Senecal, Denys Lavergne, Jean-Pierre Corbeil, Thérèse Guenard, with Pierre Martineau on the piano. The ensemble entertained delegates with musical selections ranging from light operetta to popular show tunes. A well fed crowd then danced until the wee hours to the big band sound of Noël Talarico's orchestra.

Thursday's highlights

Even on the final day of the conjoint convention, the scientific sessions were still well attended by delegates. Two of the convention's most popular speakers on Thursday were Drs. Pierre Desautels and André Prevost, whose lecture on "Composites et Cosmetiques" was standing room only. Another well attended lecture, given in English by Drs. Ronald Fisher and William B. Donohue was "Oral Cancer: Early Diagnosis and Rehabilitation of the Patient."

Dr. William Shaw, who spoke on a topic dear to the hearts of many practitioners, "The Computerization of Dental Practice Administration" also had a full crowd of interested delegates.

Those delegates not in attendance at the

A large attentive crowd was in attendance to hear Dr. Thomas Graber deliver this year's Grieve Memorial Lecture.

The large exhibit hall drew over 130 exhibitors to the Convention.

The "April in Montreal" soirée on Tuesday night drew delegates in large numbers. Delegates here can be seen enjoying pre-soirée festivities.

Among those attending the successful table clinic program on Wednesday were (L-R) Dr. Arthur Schwartz, Dean, University of Manitoba, Dr. Donald Williams, former CDA President, and Dr. Gordon Thompson, Dean, University of Alberta.

Guests to the President's Gala Evening Wednesday were entertained by (L-R) Denis Lavergne, Therese Guerard, Suzanne Senecal and J-P Corbeil.

Dr. Robert Hicks (Left) chats with Premier René Lévesque at the CDA-ODQ President's Luncheon.

lectures on Thursday were probably in the exhibit hall. Until the exhibitors closed their doors, many delegates were still taking in the displays.

The convention closed on April 12 with a conjoint CDA-ODQ president's luncheon. Following a cocktail reception honoring the featured speaker, Quebec's Premier René Lévesque, delegates adjourned to the Grand Salon of the Queen Elizabeth Hotel to dine and hear the Premier's remarks.

Delegates were greeted by Convention General Chairman, Dr. Michel Jahjah of Montreal and Dr. Robert Hicks, CDA President, of Vancouver, in both official languages.

Dr. Hicks, speaking in French, admitted freely to the delegates in attendance that his command of French was, according to family critics, in the same league as that of John Diefenbaker, but he continued gamely once the appreciative laughter had died down. He assured delegates that when Dr. Ralph Crawford, CDA's president-elect from Winnipeg, Manitoba, became president next year, it would be expected that Dr. Crawford would deliver his entire speech in French.

While Premier Lévesque, speaking mainly in English, noted that the province was recovering nicely from the recent economic slump, he surprised many delegates near the end of his remarks by voicing support for the CDA and ODQ's stand against the Canada Health Act.

The premier found other common ground by referring to the problems of providing dental care in many rural areas in Quebec and looking to co-operation with the dental profession in the search for solutions. In closing he stressed the hospitality that characterizes Montreal and expressed the hope that the many delegates would find their way back as welcome visitors.

After a full and interesting week, good weather, even in the cruelest month, good food and plenty of warm hospitality, many attendees may be inclined to accept his invitation.

DR. THOMAS M. GRABER DELIVERS ANNUAL GRIEVE MEMORIAL LECTURE

Dr. Thomas M. Graber, DMD, MSD, PhD of international stature as an author, administrator, clinician, scientist and teacher, and presently director of the Kenilworth Dental Research Foundation in Illinois, presented the 1984 Grieve Memorial Lecture during the CDA-ODQ Conjoint Convention in Montréal.

Dr. Robert Hicks, President of the Canadian Dental Association, introduced Dr. Graber, who presented a two-part lecture

on "Diagnostic and Treatment Procedures for Temporomandibular Joint Dysfunction Syndrome."

Speaking to a capacity audience of CDA and Canadian Association of Orthodontists members, Dr. Graber said that "after many years of dedication to mechanistic, articulator-oriented interpretations of stomatognathic function, the past 5-10 years have produced a veritable gold mine of information for the dentist, destroying much of the dogma and cultism that has permeated our restorative, prosthetic and orthodontic thinking for far too long. As a result, the dentist may now legitimately consider himself an applied biologist."

(Dr. Graber kindly provided a résumé of his two-part lecture exclusively to the JCDA. His résumé follows.)

The anatomic and physiologic basis for diagnostic and therapeutic procedures in TMJ dysfunction management

This paper will outline some of the salient advances in our compendium of knowledge that have had the greatest impact on the recognition and treatment of TMJ dysfunction problems. The second half is on diagnosis and treatment of specific problems.

The intimate details of structure of the dental arches and osseous components of the maxilla and mandible are well known. Serious attempts to reproduce the temporomandibular joint function date back to Hanau and Gysi, and even before. But the great variability of articular eminence size, shape and inclination, the variability of fossa depth and size, and the equally variant differences of condylar size, shape inclination and position have been discussed almost as much as occlusion and articulation of the teeth themselves. The unique teamed-effort and functional response of the contra-lateral condyle has made replication of stomatognathic function even more difficult, regardless of the complexity and sophistication of the articulator and the inviolate tenets of that pseudo-science of gnathology. As one doubting Thomas was heard to remark, "I wonder how many articulators the orthopedic surgeon uses for the relatively simpler knee, shoulder and elbow joints?" And an intriguing definition of gnathology has been proposed by Lysle Johnston, to wit: "The science of how articulators chew."

A major reason for the de-emphasis of hinge-axis, gnathologic orientation is the recognition of the multi-system involvement in TMJ function. In addition to the obvious hard tissue structures (teeth and bone), we now recognize the importance of the neuromuscular, circulatory, endocrine, respiratory and neurologic systems. Any cybernetic model must include an analysis of the action, reaction or interaction of the following components. The enveloping superstructure of interactive behavioural components assumes greater importance all the time, as the biologic computor, the brain, processes the feedback from the multi-tissue systems.

TMJ cybernetic model must include

1. Brain & neurological system.
(1) Motor, sensory, feedback response.
(2) Psychological make-up and sensitization.
2. Circulatory system.
(1) Blood volume, temperature, oxygen and nutritional supply.
(2) Lymph and other humoral elements.
3. Endocrine system.
(1) Fight or flight phenomenon.
(2) Stress effect control and reaction with other systems.
(a) Vasoconstriction, etc.
4. Respiratory system.
(1) Functional efficiency under stress.
5. Muscle system.
(1) Interaction with each other and with nerve system.
6. Temporomandibular joint elements.
(1) Eminence
(2) Disk
(3) Condyle
(4) Capsule
(5) Ligaments
(6) Muscle attachments
(7) Retrodiskal pad
(8) Synovial membrane
(9) Neuromuscular interaction.
(10) Humoral elements
7. Osseous structural components.
(1) Temporal fossa
(2) Maxilla
(3) Mandible
(4) Hyoid bone
8. Tooth system.
(1) Individual parts and their spatial and functional relations.
9. Developmental and retrogressive changes.
(1) Diseases or problems in rest of body.

Results of Recent Anatomic and Physiologic Investigations

The dominant role of Meckel's cartilage in the embryologic development of the mandible is described in embryology texts for the last 75 years. Less well known is the fact that it is the progenitor of parts of the middle ear, as well. And what has been overlooked is the existence of a ligamentous attachment between the mandibular condyle and the malleus – the mandibular-malleolar ligament. Costen's original recognition of otologic manifestations of TMJ dysfunction was further amplified by Myrhaug in the 60's, showing the existence of this ligament as a factor in referred ear pain and tinnitus, often present in TMJ dysfunction patients. He also was one of the first to point out the presence of elastin fibers in both the ear and the posterior TMJ disk attachment. There is a very real structural basis for myriad ear complaints encountered in many TMJ patients.

Of major importance, also, is the recognition that the TMJ meniscus or disk is the only articular disk in the body with a muscle attached to it. Embryologic studies make it clear why this is so. Not only is the disk formed from the superior head of the lateral pterygoid muscle, but the retrodiskal pad also comes from the same embryonic structures as Sicher, Rees and Moffett have shown. Of equal importance is the fact that the lateral pterygoid muscle is the source of the blood supply for the neurovascular zone of the retrodiskal pad, as well as the rich condylar plexus recently demonstrated by Biggerstaff. Nutrition, endocrine control, waste removal all depend on proper maintenance of this vital artery.

More definitive studies of the posterior disk attachment, the bi-laminar zone or the retro-diskal pad as it is most commonly termed, have elaborated the role it plays in TMJ physiology. In habitual occlusion, the two lamina are relaxed and approximate each other. Both the heavier elastin fibers in the superior lamina and the lighter elastin fibers of the inferior retrodiskal lamina present an undulating continuity as they run from the posterior disk periphery to the capsule. In the protruded or open mouth condylar position, the retrodiskal pad is stretched, with the superior lamina horizontally oriented and with the elastin fibers straightened out and under tension. The inferior lamina is also stretched, but its attachment to the capsule is in a more inferior position, so that its orientation is more oblique, opening up a "V" shaped space between the lamina for the neurovascular zone. The loosely filled fibrous connective tissue is well supplied with blood vessels and nerves and engorges with blood in the protrusive position as Mercuri has shown. Petrovic has noted the importance of this unique structure in the development and function of the temporomandibular joint. The opening and forward posturing of the condyle increases the iterative activity with the increased blood flow. This in turn increases the metabolites such as STH growth hormone, testerone, insulin, thyroxin, calcitonin, parathormone and growth-promoting peptides. At the same time, it decreases the catabolites and the limiting negative feedback. Specifically, there is a reduction in cyclic AMP, prostaglandin and E_2 (a

somatostatin-like substance), as well as the waste by-products such as lactic acid. Ward has shown that the fluid pressure does not increase in the joint on protrusive manoeuvres as the condyle moves downward and forward on the articular eminence, despite engorgement of the bi-laminar zone. But there is an increase in fluid pressure on functional retrusion as the condyle returns to the fossa position. It has been suggested that this is due to the condyle exerting a hydraulic pressure-like force to assist in expulsion of catabolites. Hence there is a combined circulatory flow and mechanical action involved. The neurovascular zone between the superior and inferior lamina retrodiskal pad lamina is reduced in size, as is the vascular engorgement.

Christensen has observed that the post-functional hyperemia is not limited to the retrodiskal pad alone, but also occurs in the associated musculature. The retrodiskal pad is normally non-articulatory, or should be during normal function. The structures are compressible and not well adapted to resist the effects of condylar impingement, particularly during nocturnal parafunctional activity.

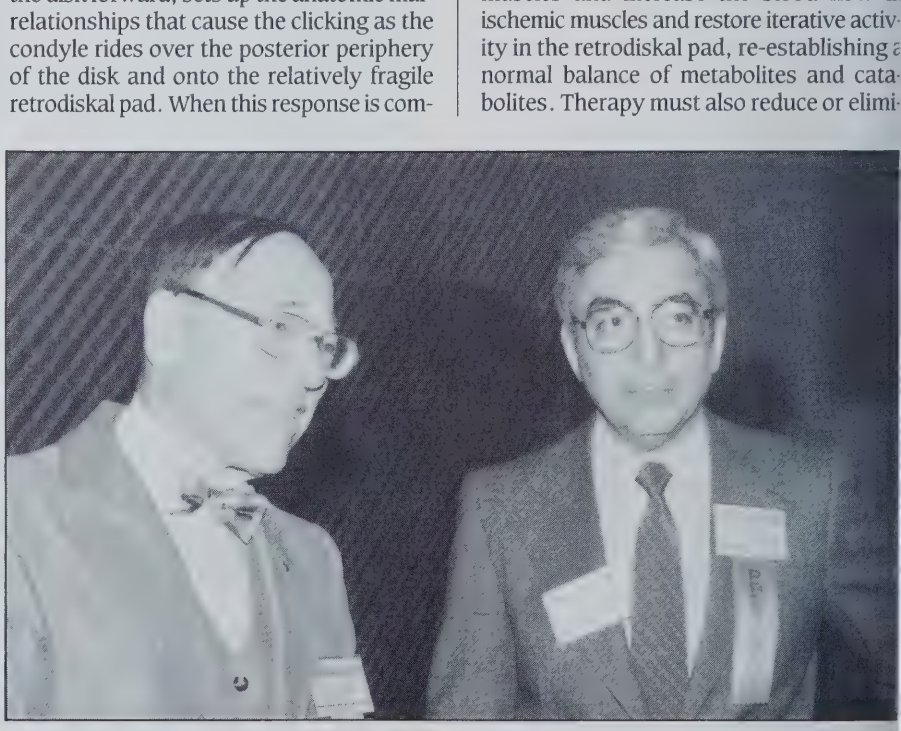
The bi-concave "capping" nature of the articular disk is shown in most anatomy books. This contiguity with the condyle has made it difficult to interpret arthrograms of the lower joint cavity, particularly. While the meniscus is known to be of fibrocartilage, it has only recently been recognized that the cartilage component forms later — about 21 years of age. The disk is thus quite flexible during the growing years and is better adapted to the compressive and shearing forces produced during normal function. Only the peripheral portions, particularly contiguous to the retrodiskal pad, are capable of repair. This is why early recognition of TMJ abnormalities is so important.

Innervation of the TMJ has been exhaustively studied and plotted by Thilander. The dense plexus of unmyelinated fibers in the capsule are densest in the posterior and lateral aspects. They are mostly free-nerve endings, which transmit pain. Complex endings which are responsible for positional or proprioceptive signals are fewer in number. The auriculotemporal nerve is the major supplier, but is assisted by twigs from the masseteric, deep temporal and lateral pterygoid nerves which end in the trigeminal nerve. Both anterior and medial aspects of the capsule are minimally supplied with nerves. Pain recognition is primarily from the posterior and lateral aspects. Despite the presence of mechanoreceptors in the TMJ and the periodontal membrane, the major interdental discrimination is in the closing muscles of the mandible, according to Morimoto, Ozaki, Yoshimura and Kawamura.

Telemetry is now used extensively to record functional movements. In postural rest position, the condyle is not normally in the most retruded position. Since condylar movement from postural rest position to habitual occlusion is essentially a rotary action of the condyle in the lower joint cavity, it follows, as Posselt has shown, that centric occlusion is not a hinge-axis border position as has been trumpeted by our gnathologically indoctrinated colleagues. Indeed, a retruded border position in the fossa is patently abnormal and often seen in association with anterior disk displacement and functional retrusion status.

Aberrations are more likely to occur in deep bite cases, as Boman and Blume showed in their transcranial radiographic studies of normal and Class II malocclusion patients in postural rest and occlusal positions. Not only may the posterior displacement of the condyle exert more pressure on the retrodiskal pad, with the potential of damage to this critical non-articulatory, compressible structure and enclosed neurovascular zone, but it may also elicit a stretch reflex action in the superior head of the lateral pterygoid muscle, attached as it is to the anterior margin of the disk, as it stabilizes the mandible on the closing movements. Trigger points, as observed by Travell and Lange, may occur, with concomitant ischemia and referred pain. The resultant conflict of dominant posterior temporalis and deep masseter fibers, forcing the condyle upward and backward, while the superior head of the lateral pterygoid pulls the disk forward, sets up the anatomic malrelationships that cause the clicking as the condyle rides over the posterior periphery of the disk and onto the relatively fragile retrodiskal pad. When this response is combined with uncontrolled parafunctional activity, under an aura of stress, strain, tension or inability to cope, the problem is exacerbated. Telemetry has shown that there are three clenchers to every bruxer. During the day, undue stress to the teeth and TMJ is mediated by the mechanoreceptors in the periodontal ligament and in the muscles themselves. But there is no built-in protective device at night in the REM light plane of sleep. This relative reduction of proprioception at night may be the "Achilles heel" or more appropriately the "Achilles joint" that has resulted in a disease of modern civilization. Primitive tribes seldom have the level and frequency of nocturnal parafunctional activity now observed in our highly structured society.

The recurrent spasm and ischemia in the lateral pterygoid muscle and retrodiskal pad, the excessive fatigue by-products and trigger points created in the superior head of the lateral pterygoid muscle and posterior temporalis fibers particularly and the attendent functional limitations and pain associated with TMJ dysfunction require multiple therapeutic ministrations. Such measures must prevent overclosure, establish normal rotary action of the condyle from postural rest to habitual occlusion and eliminate any condylar retrusion to prevent any stretch reflex response in the superior head of the lateral pterygoid. This aberrent response produces a protractive influence on the meniscus as the condyle is being retruded by the dominant posterior temporalis activity. Therapy must relax the muscles and increase the blood flow in ischemic muscles and restore iterative activity in the retrodiskal pad, re-establishing a normal balance of metabolites and catabolites. Therapy must also reduce or elimi-



Dr. Thomas Graber is seen left, with Dr. Frank E. Shamy, President of the Canadian Association of Orthodontists, following Dr. Graber's presentation of the Grieve Memorial Lecture.

nate the undesirable effects of bruxism or clenching, hopefully by helping the patient to control the iatrogenic expression of the stress-strain-tension release syndrome. Such therapy can then prevent the condyle from riding over the posterior disk periphery, or from deforming the disk itself during function. Intercepting disk displacement, disk dysfunction or actual disk dyscrazia will go a long way toward preventing crepitus and the incipient osteoarthritic changes seen in both the condyle and articular eminence by Kopp after repeated micro and macro traumatic experiences. Optimal treatment results require a comprehensive diagnostic discipline and therapeutic measures that address multiple morpho-functional considerations.

Thanked by Dr. Crawford

Dr. Ralph Crawford, President-Elect of the CDA, thanked Dr. Graber for his lecture and presented a framed certificate to commemorate the occasion.

Dr. Graber received his DMD from Washington University in St. Louis, Missouri in 1940, his MSD from Northwestern University Dental School in 1946, and his PhD in anatomy from Northwestern University School in 1950. He is both a co-founder and director of the Kenilworth Dental Research Foundation in Kenilworth, Illinois. One of his major books, "Orthodontics: Principles and Practice," is now in its 4th edition.

CDA-ODQ CONVENTION: PIERRE FAUCHARD ACADEMY MEETS IN CANADA

For the first time in Canada, the Pierre Fauchard Academy met April 12, in conjunction with the Canadian Dental Association convention held in Montreal.

Honored guests at the breakfast meeting included Dr. Robert B. Shira, President of the Academy, who was the breakfast speaker. Also in attendance were: Dr. Donald V. Dendinger, President-elect of the Academy, Dr. C. Robert Breckenridge, Vice-President, and Dr. Clifford P. Loader, Editor.

Representing the Canadian Dental Association were Dr. Robert Hicks, CDA President and Hubert Drouin, Executive Director of the Association. The Order of Dentists of Quebec was ably represented by Dr. Marc Boucher, President and Dr. Pierre-Yves Lamarche, Executive Director.

Dr. Lorne V. Taylor, Chairman of the Canadian Section of the Academy, and Dr. Clyde Covit of Montreal were instrumental in organizing the breakfast and obtaining Dr. Shira to speak to the delegates.

In his remarks to those in attendance, Dr. Shira stressed that the role of the Academy today was one of assisting the current leaders of dentistry in providing the leadership and actions require to maintain high standards of professional excellence. A goal of the Academy in the coming year, Said Dr. Shira, would be to promote professionalism in dentistry and that dentists must "be ready and willing to speak out and tell our audiences and the public at large what is good about dentistry."

A further highlight of the gathering was the presentation of a wood carving to Dr. Lorne Taylor by Dr. Victor Ramon Hoyos, Chairman of the Latin American Section of the Academy. The carving was meant to symbolize friendship within the Academy.

In attendance for the Pierre Fauchard Academy breakfast meeting were (L-R) Dr. Robert Hicks, CDA President, Dr. Robert B. Shira, President of the Pierre Fauchard Academy, Dr. Lorne Taylor, Chairman of the Academy's Canadian Section and Dr. Clyde Covit, one of the breakfast's organizers and a former CDA president.

(Photos by Carolyn Hackland)

Mr. Lloyd Bowen, centre and his wife Helen, left, admire an original oil painting presented as a token of CDA's appreciation to the recently-retired fluoridation officer by CDA President, Dr. Robert Hicks, right.

CDA AND ADA HONOR RETIRING CDA FLUORIDATION OFFICER

Recently retired CDA Fluoridation Officer Lloyd Bowen was honored at the CDA-ODQ Conjoint Convention in Montréal in April by both the Canadian and American Dental Associations.

CDA President Dr. Robert Hicks praised Mr. Bowen's service, expertise and counsel in the field of fluoridation and presented an original oil painting by a prominent Québec artist, Yvette Boulanger.

He also awarded, on behalf of the American Dental Association, a plaque for "significant contributions to the oral health of the public through preventive dentistry."

Mrs. (Helen) Bowen received a corsage from CDA Executive Director Hubert Drouin.

25 years of promotion

Mr. Bowen, who was born in Sherbrooke, Québec, November 3, 1903, had been involved in the promotion of fluoridation for 25 years at the time of his retirement.

Shortly after joining the Health League of Canada in 1959, he became the executive secretary of that organization's National Fluoridation Committee. He continued to promote their program for seven and a half years. One of the highlights of this period of his career, he recalls, is that he was secretary of the committee that persuaded Metropolitan Toronto to adopt fluoridation, after a two-year campaign.

In 1967, he joined the Canadian Dental Association as Information Officer and served in that capacity for five years. He became Fluoridation Officer in 1972 and

held that position for twelve and a half years.

During this career, he won previous honors. In 1977 he received the Queen's Silver Jubilee Medal and in 1979, he was made an Honorary Member of the CDA, the first non-dentist ever to receive such an award.

Distinguished military career

Mr. Bowen also had a distinguished military career during the Second World War.

At the outbreak of hostilities, he was named chief instructor of the Canadian Officers' Training Corps unit at his Alma Mater, Bishop's University in Lennoxville, Québec.

Later, he enlisted for active service with the Governor General's Footguards, and served six years. At the time of his discharge, he had attained the rank of Major and had received the Efficiency Decoration.

He served for a period after the war in the Adjutant General's Branch of National Defence Headquarters.

Married in 1944

Mr. Bowen married the former Helen Jane Dingle in 1944.

One of the joys of retirement, Mrs. Bowen said following the Montréal award-giving ceremony, was that she would no longer have to listen to discussions of chemical formulae.

EXECUTIVE DIRECTOR'S REPORT ON THE 1984 INTERIM BOARD OF GOVERNORS MEETING — HIGHLIGHTS

As part of its regular business the Board of Governors received the Audited Statement for the CDA and the CDRF for the year ending December 31, 1983, prepared by the firm of McCay, Duff & Company.

The balance sheet and the statement of Revenue and Expenses is published for your information in this issue of the Journal.

The following items of business were reviewed and discussed by the Board and additional information regarding each item will be provided in future issues.

Membership Fee Increase

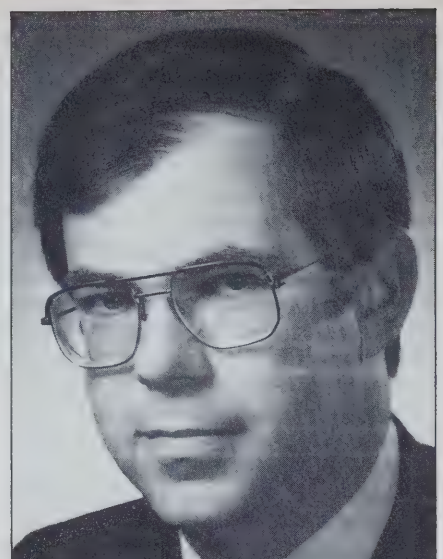
The membership fees for 1986 will increase by 4.4% from $225.00 to $235.00.

Taxation

Items on the subject of Taxation discussed at the Board meeting were highlighted in the recent CDA Communiqué dated April, 1984.

Assignment

The Board approved the re-affirmation of the CDA's existing statement on assignment whereby it states that the Canadian Dental Association is opposed to the principal of assignment. This decision was based on a report provided by the Council on Health Care which considered documentation on assignment from Corporate Members, and other available material on the subject.



Herbert Drouin
Executive Director

Ad Hoc Committee on Dental Insurance

The Board has approved the formation of an Ad Hoc Committee on Dental Insurance reporting to the Executive Council. This Ad Hoc Committee will study and report on CDA's role in assisting its members with third party agents (insurance cariers).

Task Force on Convention Policy

The Board was informed of the establishment of a Task Force on Convention Policy formed to plan and establish a national convention policy with the intentions of planning the future sites and dates of CDA Conventions.

It is anticipated that the Task Force will have a report ready for consideration of the Board at its September Annual Meeting.

Manpower Study Update

The Board was informed that an updating of the Manpower Supply study is currently underway and that an updated report should be available some time late in May, 1984.

Canada Health Act

The Board reviewed the February 22, 1984 presentation of the Association to the House of Commons Standing Committee on Health Welfare and Social Affairs relative to the Canada Health Act. Subsequent to this presentation, and as requested in the CDA's Brief, the Association provided input with regard to the Regulations relevant to dentistry and to Section 2 of the Act. An amendment to the original Act indicates that the comments provided were given positive consideration.

Constitution & By-laws

The Board approved a revised statement on Conflict of Interest relative to members of the Board of Governors, members of various Committees and Councils of the Association including the Executive Council.

Oral Care of Chronic Care Patients

As recommended by the Council on Hospital Services, the Board approved a resource document on Oral Care of Chronic Care Patients. The Board further approved the development of guidelines for the oral care of chronic care patients. These guidelines will be put forth for Board approval at a later date. Information on the aforementioned resource document will appear in a future issue of the Journal.

Guidelines for Sterilization Procedures in Hospital Dental Departments

The Board of Governors has approved Guidelines for Sterilization Procedures in Hospital Dental Departments prepared by the Council on Hospital Services. The object of these guidelines is to provide a practical method for use in hospital dental departments to control infections. Publication of these guidelines will appear in an upcoming issue.

Dental Awareness Program

The Council on Information Services informed the Board of the hiring of a consultant to work on the Dental Awareness Program. Specifically the consultant will research and collect pertinent data available from various sources. Based on the consultant's report the Council will be in a position to submit further recommendations relative to the Dental Awareness Program to the Governors in September.

Practice Management Manual

The Council on Student Affairs reported to the Board that the Practice Management Manual has now been completed having been critiqued by teachers of Practice Administration at the dental faculties, edited and reviewed by the Executive Council. Distribution has been initiated and student members will receive the manual as a member benefit. The Manual is available to CDA dentist members at production cost and to non-members at cost plus administration charges.

BALANCE SHEET
AS AT DECEMBER 31, 1983

ASSETS	1983	1982
CURRENT		
CASH	$ 995,962	$1,062,441
Cash – Building Contingency Fund	20,800	–
Deposit certificate	500,000	–
Accounts receivable	78,840	61,399
Inventory (note 1)	39,348	40,202
Prepaid expenses	90,393	36,611
	1,725,343	1,200,653
FIXED (notes 1 and 2)	1,303,200	1,353,140
	3,028,543	2,553,793
TRUST ASSETS		
Cash	61,742	58,495
Bonds and deposit certificate	1,000	5,343
Library books and furniture (at nominal value)	1	1
	62,743	63,839
	$3,091,286	$2,617,632
LIABILITIES		
CURRENT		
Accounts payable	$ 110,879	$ 70,839
Deferred revenue	595,577	542,600
Current portion of long term debt	18,000	6,000
	724,456	619,439
LONG-TERM DEBT (note 3)	404,387	430,387
MEMBERS' EQUITY		
SURPLUS	1,018,887	587,214
EQUITY IN FIXED ASSETS	880,813	916,753
	1,899,700	1,503,967
	3,028,543	2,553,793
TRUST LIABILITIES AND EQUITY		
Accounts payable	–	333
Library Trust Fund	56,166	57,373
The Grieve Memorial Lectureship Fund	6,577	6,133
	62,743	63,839
	$3,091 ,286	$2,617,632

1983 FINANCIAL REPORT

The audited financial statements of the Canadian Dental Association were adopted at the interim meeting of the CDA Board of Governors. The Balance Sheet and Statement of Revenue and Expense for the year ended December 31, 1983 have been extracted from the Auditors' Report and are presented for your review. Copies of the complete audited statements as prepared by McCay, Duff & Company may be obtained from the CDA Resource Centre.

STATEMENT OF REVENUE AND EXPENSES
FOR THE YEAR ENDED
DECEMBER 31, 1983

	1983		1982
	Budget	Actual	Actual
REVENUE			
Fees (schedule A)	$1,842,735	$1,902,367	$1,817,040
Grants	39,000	41,994	37,669
Journal (schedule C)	413,750	383,743	359,075
Publications	50,000	59,338	56,911
Interest	60,000	115,131	148,881
Rental	118,921	116,307	110,556
Other (schedule B)	28,000	42,488	28,178
Annual convention	–	373,914	–
	2,552,406	3,035,282	2,558,310
EXPENSES			
Honoraria and per diem	173,450	175,505	171,984
Salaries and benefits	568,028	557,814	515,940
General and administration (schedule D)	314,400	296,706	279,083
Annual convention	–	350,517	–
Conferences	27,500	25,968	32,933
Journal (schedule C)	486,058	412,321	409,805
Other publications (schedule E)	68,000	83,207	68,239
Institutional advertising	–	–	1,717
Travel and meetings (schedule F)	309,795	334,940	292,661
Unbudgeted Projects (schedule F)	–	20,848	34,984
Property management	271,200	225,900	234,833
Dental Health Month	45,000	30,503	30,649
Accreditation surveys	45,000	31,040	27,588
Dental Aptitude Program	43,500	56,999	45,848
Membership campaign	25,000	16,257	13,193
Student affairs	11,800	19,885	15,314
F.D.I. administration	6,000	1,139	1,487
	2,394,731	2,639,549	2,176,258
EXCESS OF REVENUE OVER EXPENSES FOR THE YEAR	$ 157,675	$ 395,733	$ 382,052

1983 FINANCIAL REPORT

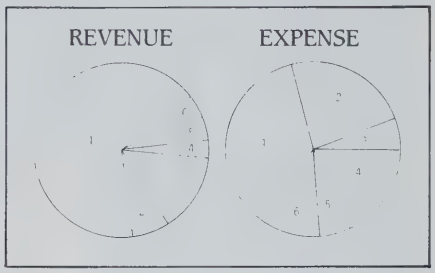
When reviewing the Statement of Revenue and Expense the annual convention amounts shown should be removed to allow comparison of budget projections and actuals for the year.

The results of this action give us an actual revenues total of $2,661,368 against projected revenues of $2,552,406 and an actual expenses total of $2,289,032 against projections of $2,394,731.

Revenues exceeded expectations by $108,962; such increase is a result of more favorable returns on investments than anticipated and a greater number of members. From the statement it can be seen that the decrease in projected expense is mainly due to a continued decline in Journal production expense and to a 17% reduction in property management costs. The reduction in property management expense is a result of forecasting when mortgage interest rates were highest and anticipating increases; subsequently rates fell and stabilized for some time.

$1,081,559 or 47% of 1983 expense was allocated to administration functions and to property management. 53% or the balance of the year's expense was spent on CDA programs.

The following graphs portray the year's activities in major responsibility groupings.



Revenue

1) Membership fees including FDI subscription.
2) Educational Services: Student fees, DAT Program revenue, Accreditation Survey fees and grants for educational purposes.
3) Journal revenue includes commercial and classified advertising and subscriptions income.
4) Promotional Programs: Cost recovery from pamphlet program, Seal of Recognition and Dental Health Month promotional materials.
5) Interest and foreign exchange.
6) Rental income.

Expense

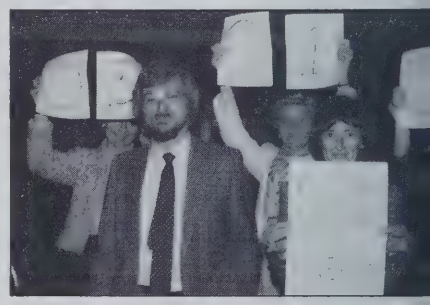
1) Administration expense includes staff salaries and benefits.
2) Travel & Meeting expense includes honoraria and per diems.
3) Educational Services: Expenses for Student Affairs, DAT Program, Educational Conferences and Accreditation Survey expense.
4) Journal production expense includes salaries of Journal staff.
5) Promotional expense includes cost of pamphlets distributed, Dental Health Month promotion and direct cost of membership campaign.
6) Property management expense.

MONTREAL MONTAGE *Photos by Carolyn Hackland*

Dr. J. G. Blackmer (Left), Director of Dental Health Service for New Brunswick, chats with Dr. Norm Layton, of Truro Nova Scotia, former President of the NDEB, at CDA's Board of Governors meeting in Montreal.

(L-R) Dr. Jack Gryfe, Chairman of the Council on Hospital Services, Brian Henderson, CDA's Director of Accreditation and Dr. Ken Bentley, Chairman of the Council on Education share a (CDA Accredited) joke at the Board of Governors luncheon.

Will the real Dr. Thompson please step forward? (L-R) Dr. Don Thompson, Calgary Alberta, Dr. William R. Thompson, Trenton, Ontario, CDA past-president, Dr. Gordon Thompson, Dean, Faculty of Dentistry, University of Alberta and Dr. Jack Thompson, Executive Director, New Brunswick Dental Society pose for the camera at the CDA Board of Governors meeting.

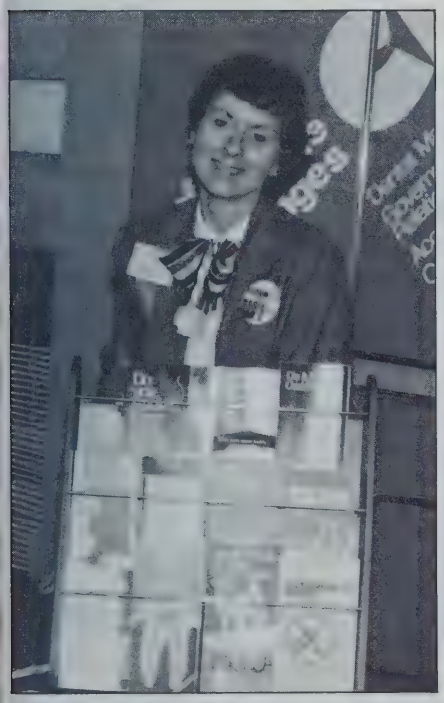


Dr. Jack Gryfe, Chairman of CDA's Council on Hospital Services is given a "rating" on his presentation to the Board of Governors by CDA staff members, who wish to remain anonymous.

Long lines formed for registration in the Palais des Congrès on opening day.

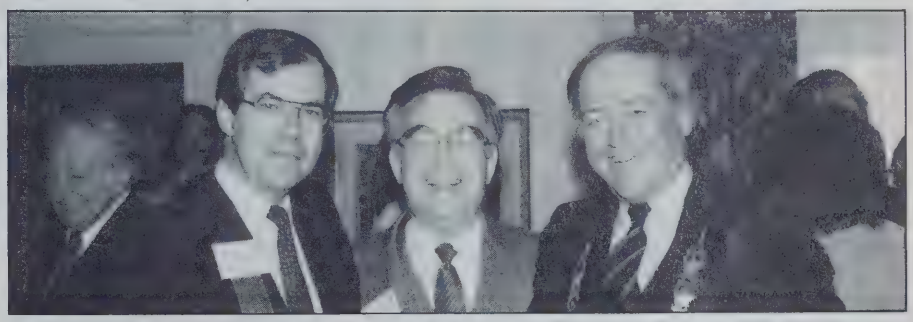
The dental hygienists also formed a crowd to register for the CDA-ODQ Convention.

The Hepatitis B screening clinic drew nearly 250 patrons during the course of the convention.

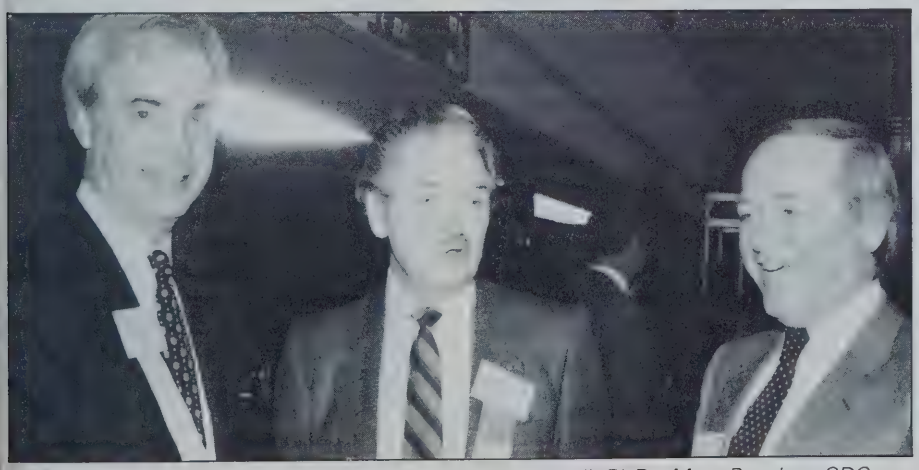


Linda Teteruck, CDA's convention liaison officer and Director of Educational Services helped when time permitted, at CDA's convention booth.

Dr. Robert Hicks, CDA's President (centre) enjoys a chat with CDA staff members (L-R) Sandra Deziel, Lorraine Emmerson and Win Mobley, at a reception commemorating CDSPI's 25th anniversary.



(L-R) Hubert Drouin, CDA's Executive Director, American Dental Association President, Dr. Donald Bentley and Dr. Robert Hicks, CDA's President look ready to dance up a storm at the President's Gala Evening.



Pictured just after the convention opening ceremonies are (L-R) Dr. Marc Boucher, ODQ President, Dr. Ralph Crawford, CDA President-elect and Dr. Robert Hicks, CDA President.

One of the many student table clinics which drew good crowds on Wednesday.

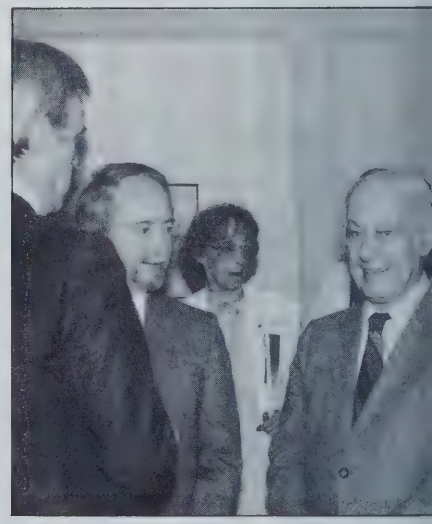
Dr. Robert Hicks and Mrs. Donald Bentley look to be having a "gala time" at the President's Gala Evening.

Laura Eva Tam (Left) one of the student table clinicians is shown with Dr. David K. Peters at the table clinics presentation on Wednesday.

Dr. Ralph Crawford (centre), CDA's President-elect, shows potential for a second career serving wine to Linda Teteruck (Left) and Pat Cunningham, CDA's Information Officer (right) at the President's Gala.

Dancers enjoy the "Bird Dance" at the President's Gala Evening.

(L-R) ADA President Dr. Donald Bentley, his wife Dorothy, and Dr. Morton Divack and his wife Ruth, Chairman of the Greater New York Dental Meeting are ready to go to the President's gala.



Premier Réne Lévesque (right) chats with (back to camera) Dr. Marc Boucher, ODQ President and Dr. Pierre-Yves Lamarche, Director General of the ODQ.

FIRST CANADIAN SPORTS DENTISTRY SYMPOSIUM CONVENED IN TORONTO

Health professionals are becoming increasingly concerned about the prevalence of injuries to young Canadians involved in contact sports.

Such concern led to the first Sports Dentistry Symposium which was held in Toronto, March 30-31.

Presented in the form of a continuing education course under the direction of Dr. Norman Levine, Professor and Head, Department of Paedodontics, Faculty of Dentistry, University of Toronto, the symposium featured speakers from Canada and the United States.

Registrants included dentists from across Canada, representatives of the Canadian and Ontario Dental Associations, the Canadian Standards Association, a sports equipment manufacturer and an officer of the Canadian Armed Forces. A number of students from the two-year sports trainer course at Sheridan College, Toronto, were also in attendance.

The course was directed at all educators, health care professionals, coaches and school administrators, who work in close contact with children, adolescents and adults involved in sports. People in these positions become directly responsible for the prevention of injuries or the emergency treatment of them, the course prospectus stated. "A cooperative effort of knowledgeable, concerned and responsible individuals is necessary to reduce injuries to the skull, neck, face, eyes and teeth."

The prospectus added that "while fast-moving contact sports such as football, ice hockey and basketball are considered the sports with the most catastrophic injuries to participants, it is also true that horseback riding, soccer, rugger, racquetball, squash and jogging have the potential to cause dentofacial, temporomandibular joint and more serious injuries to the nervous system."

Tiny tots 'sports'

In an illustrated presentation, Dr. Levine noted that tiny tots may suffer oral region injuries in their play activity, which, although unorganized, is "almost preparatory to the organized sports they will engage in at a later stage in their lives."

Some parents believe that children should experience, while still very young, the hits and knocks that will enable them to "handle themselves" later. However, Dr. Levine said, such knocks can affect certain growth areas and cause some debilitating effects later in life.

'This "dental trauma to primary dentition" can occur on swings, playground slides, jungle gyms and tricycles.

Dr. Levine expressed his concern about parents' wishes that their children get "toughened" early. He believes health professionals should warn parents about possible long term consequences of some injuries at this stage in their childrens' development.

Concerned professionals, he said, should also ensure that adequate coverage is provided through the media about the preventive aspects of sports. This would make it possible to get more funding for "adequate protective equipment."

Dr. Franklin Pulver

Dr. Pulver, who is the CDA's alternate sports dentistry advisor to the Canadian Standards Association, spoke about the treatment of trauma in the permanent dentition of the young, including splinting techniques and restorative procedures to repair chipped and broken teeth.

He explained how splinting with plastic material, to adjacent sound teeth, can hold a central loose tooth in position until it has become anchored.

Referring to sports injuries at school, he said that often parents are not aware that accident insurance carried by school boards, particularly in Ontario, does cover dental work. This is important information, he said, which doesn't reach all parents, especially those whose first language is not English.

Barry Wortzman, QC

In a graphic manner, Mr. Wortzman explained legal liabilities which may be incurred at sports events when an incident occurs between a spectator and a player, or between two players who get involved with each other. He also described subsequent potential liability which may arise from the quality of care given by a dentist, or medical professional, or a hospital, to an injured athlete.

At the amateur level, he explained, if the incident occurs in a school sports environment, the school faces legal liability only if the injury could have been avoided and negligence was the cause of the injury.

It was emphasized the number of civil suits being launched in Canada is growing and as a result, sports officials and health professionals must be extremely efficient and highly professional to avoid the possibility of facing a suit.

Dr. C.H. Tator

In the field of neurology, Dr. Tator said the incidence of brain and spinal cord injury in contact sports is on the increase. Hockey has become more aggressive. Divers are also suffering many such injuries, snowmobiling presents hazards and cyclists on busy highways add to these statistics.

In the period from 1973 to 1980, statistics on causes of accidents revealed that sports and recreation mishaps ranked second only to highway accidents. Accidents at the work place have shown a decline, Dr. Tator said, but in sports "not a very good job is being done at all," in prevention.

Hockey ranks second in sports injury statistics, he said. Forty-two accident cases

(Photos by J.C. Metcalfe)

A group of the principal participants in the Symposium look at the latest CSA-approved hockey helmet and the recently developed headform. They are, left to right: Dr. Thomas Pashby, Department of Opthalmology, University of Toronto; Dr. William C. Godwin, Professor of Dentistry, University of Michigan; Dr. Arthur Wood, Canadian pioneer in the development of mouthguards and Dr. Cosmo Castaldi, Professor and Head, Department of Pediatric Dentistry, University of Connecticut.

involving spinal injury were reported in Canadian Amateur Hockey Association figures for 1980-82. Most of these occurred during organized play and the cause was usually being pushed or checked from behind. Twenty of these victims struck the rink boards.

Dr. Tator recommended five measures to reduce the incidence of such injuries: enforcement of rules, new rules, better conditioning of the neck muscles to offer better protection to the spinal area, smaller rinks and better data collection.

He is convinced that the latest hockey helmets do protect young hockey players against major brain trauma. There has been a "virtual cessation. . (of such injuries) that we were seeing in contact sports."

Dr. Thomas Pashby

At one time the number of eye injuries, particularly in hockey, was alarmingly high, Dr. Pashby said. Now, with players wearing the CSA-approved face masks, there have been no reported injuries to the eyes.

Initially his concern for protection was instigated because his own boy was upended in a hockey game in 1959, and struck his head on the ice. At that point, Dr. Pashby said, he had two boys involved in the sport, and decided helmets and face masks were very necessary.

He believes that hazards in hockey are even greater these days because "winning is the only thing. This brings on roughousing and intimidation. I still think hockey is a great game, but it behooves us to make it a safe game."

Hockey for recreation and fun and professional hockey for profit "are really two different sports and need different rules and different coaching," he said. Recreational hockey is for "kids to have fun, not a spectacle for the parents in the stands. We must not pattern recreational sports after professional."

Dr. Pashby strongly recommends protective glasses with polycarbonate lenses for those involved in ball or street hockey, and racquetball, and eye or face shields for snowmobilers.

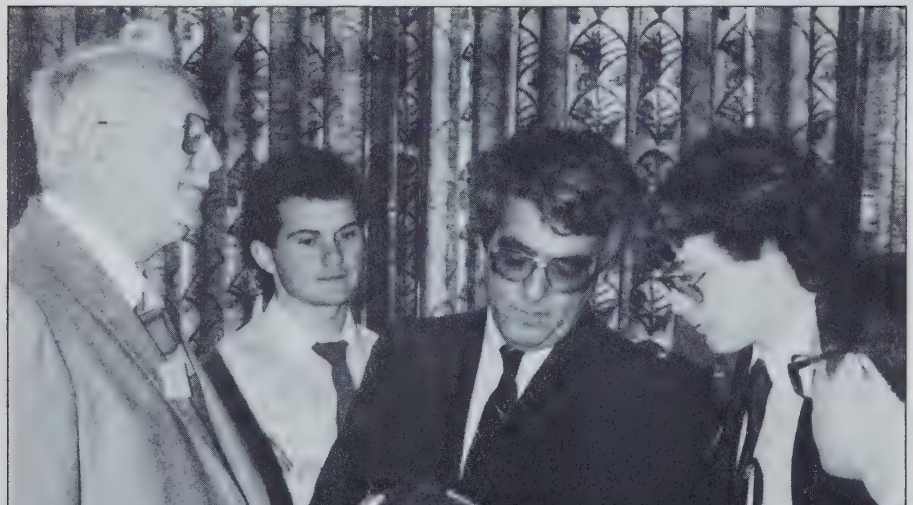
"It is much better to prevent injuries than to treat them."

Dr. Patrick Bishop

Dr. Bishop explained the nature of the Biomechanics Impact Laboratory at the University of Waterloo, where protective equipment such as helmets and face masks for hockey, football, cycling, squash and racquet sports are subjected to rigorous impact testing. This testing equipment is similar to that at the Canadian Standards Association. Testing techniques have also been borrowed from General Motors and the NASA space programs, he said.

One of the shortcomings in the effort to produce really effective protection equipment, he said, was that Canada does not yet have a good reporting system to provide sports injury statistics.

Dr. Bishop provided an illustrated account of the evolution of sports helmets from the early "pitifully inadequate strips of leather," through fibre ones, that "only gave a false sense of security," to the more effective models of recent years.



Explaining the effectiveness of the CSA-approved hockey helmet to a group of sports trainer students from Sheridan College (Toronto), is Dr. Franklin Pulver, centre, CDA alternate member on the CSA Technical Committee which develops standards for sports protective equipment. Looking on at the right, is Dr. Arthur Wood, CDA appointee to the CSA Technical Committee, a Toronto area paedodontist who is the Canadian pioneer in the field of protective mouthguards.

Dr. Arthur Wood

Dr. Wood, the Canadian pioneer in the development of effective mouthguards for athletes, appeared to shock himself a bit when he said, "I've been working at this for 32 years."

Most of his audience, however, was aware that the length of his service has been matched by his clear devotion to the improvement of oral protection for athletes and by the quality of his contribution in this field.

He explained that his incentive was generated from both professional and personal standpoints.

As the coach of a minor hockey team in Mississauga, Ontario, Dr. Wood noted that "most injuries in hockey were to the mouth – a challenge to the dental profession." He also has a son who was a goalkeeper, and "my daughter played hockey too."

In the early days, he said, they did have "a primitive type of mouthguard, intra-oral but they were of a standard size, ill-fitting. They fell out and were lying all over the ice."

He said some stock type mouthguards still on the market "should be illegal." The dentist should be involved in providing mouthguards. The custom-made devices are much more effective because they fit properly.

Dr. Wood expressed his satisfaction with the "real team effort" these days, to prevent sports injuries, on the part of medicine, dentistry, coaching staff members, educators, athletic trainers, etc.

Dr. C.R. Castaldi

Dr. Castaldi, a native of Sudbury, Ontario, extended congratulations on what is being done in Canada to prevent sports injuries. In particular, he praised the work of Dr. Wood – "a real national resource in Canada!"

He traced the history of mouthguards, noting that "they go back to the early 1950s, when mandatory laws were introduced in professional football." Dentists began to prove the beneficial aspects of such devices and a mandatory faceguard rule was the result in the 1970s.

Turning to the Canadian sports scene, he said a much better faceguard had been developed in Canada than that used in the United States.

He observed that football is a rough game in Canada, but he finds that "hockey is a wild and crazy game – mayhem." He wondered "why would anyone ever want to play it?"

Dr. Castaldi did, however, confess that he likes to play "a little old-timers hockey" occasionally.

(One of the organizers of the symposium reported that when Dr. Castaldi was invited

to speak, he answered that he'd gladly come and renounce his fee, if some ice time could be provided.)

Dr. William Godwin

Dr. Godwin said he got involved with mouthguards in 1952, providing them for members of the University of Michigan hockey team. He also saw the necessity to develop a mouthguard for students playing band instruments. The mouthpieces pushed against their lower front teeth.

He believes "any of the mouthguards (available) will work" but, to be truly effective, they must fit properly. His primary interest, Dr. Godwin said, is protection for young hockey and football players.

He predicted that in the United States, "by 1990 every secondary school kid will wear a mouthguard in contact sports."

'First of many'

Dr. Levine said "this is the first symposium of this type, to our knowledge, ever held in Canada. I hope it will be the first of many which will be held across this country."

His hope is shared not only by the participants in the Symposium, but by others knowledgeable about sports injuries requiring dental treatment, including dentists in communities across Canada. As a first conference on this topic, it appears to have illustrated both the extent of the problem and the strong interest and growing response of many dentists, following in the footsteps of Dr. Arthur Wood.

PRINCIPAL PARTICIPANTS AT SYMPOSIUM

In addition to Dr. Levine, the principal participants at the first Canadian Sports Dentistry Symposium were:

Dr. Franklin Pulver, Assistant Professor, Department of Paedodontics, University of Toronto;

Dr. S. Weinberg, Associate Professor, Department of Oral and Maxillofacial Surgery, University of Toronto;

Mr. Barry Wortzman, QC, a Toronto barrister;

Dr. C.H. Tator, Chief of Neurosurgery, Sunnybrook Medical Centre, Toronto;

Dr. Thomas J. Pashby, Department of Opthalmology, University of Toronto;

Dr. Patrick J. Bishop, Professor of Kinesiology, University of Waterloo, Waterloo, Ont.;

Dr. Arthur Wood, an Islington, Ontario, paedodontist and dental consultant to the Canadian Standards Association for the Canadian Dental Association;

Dr. Cosmo Castaldi, Professor and Head, Department of Pediatric Dentistry, University of Connecticut, New Haven;

Dr. William C. Godwin, Professor of Dentistry, University of Michigan, Ann Arbor.

CDSPI CELEBRATES 25 YEARS

This year CDSPI is celebrating its 25th year of service to the dental profession. It may surprise many dentists that CDSPI has been established and serving their insurance and investment needs for so many years. In fact, many dentists may still be unsure of CDSPI's role in the dental profession.

CDSPI was formed in 1959 as a central service and administrative agency for the profession, to handle the accounting and administration of such programs as the Ontario Dental Welfare Plan and a post treatment payment plan. At that time there were no comprehensive national and provincial insurance plans. However, a number of component societies in Ontario had sponsored group plans for their members, and these plans were amalgamated in 1958 under the auspices of the Royal College of Dental Surgeons of Ontario (RCDS) to form the first provincial plan. In the late 1950's the Canadian Dental Association began sponsoring an insurance plan as well as a retirement savings plan for its members. In the 1960's CDSPI began to collect and disburse insurance premiums for the Ontario insurance plan on behalf of the RCDS, in addition to its work on the welfare programs. In the late 1960's a series of changes took place, significantly affecting CDSPI and the dentists it served.

The responsibility for the Ontario insurance program passed from the RCDS to the Ontario Dental Association (ODA) when the ODA was restructured in 1967. This plan, as well as that of the CDA, continued to grow in the 1960's. The competition between the plans grew as well, and in 1968 a CDA/ODA Ad Hoc Committee was set up to resolve the situation. The Ad Hoc Report recommended amalgamating the two programs by combining the best features of each.

New plan – October 1969

The new plan, controlled by the CDA Council on Insurance and Investment, came into effect on October 1, 1969 under the name National/Provincial Insurance Program. CDSPI was considered the ideal organization to administer the new plan, since it was a non-profit service organization owned and operated by the dental profession. At that time, CDSPI was asked to administer the CDA Retirement Savings Plan and, as such, the insurance and investment plans for the dental profession became CDSPI's main focus.

Throughout the 1970's, CDSPI, the National/Provincial Insurance Program, and the CDA RSP all continued to grow. Periodic plan improvements ensured that the insurance and investment programs offered were of the highest quality available and were administered in the best interests of the participating dentists. This period of growth culminated in 1975 with the forming of a CDA/CDSPI Ad Hoc Committee to review the administration and control of the National/Provincial Insurance Program and the CDA RSP and make recommendations to ensure the continuation of the best possible management of the programs. The Ad Hoc Committee Report, completed in 1976, resulted in CDSPI being asked to carry out the functions and responsibilities and duties of the CDA Council on Insurance and Investment. In this capacity CDSPI was responsible for the development and review of plans, for the provision of administration of the plans, and for providing participants with information regarding the plans. The Board of Directors of CDSPI was restructured, other internal adjustments were made, and the plans themselves were retendered. When the new contracts were drawn up the name National/Provincial Insurance Program was found to be unwieldy, and the name Canadian Dentists' Insurance Program was adopted. A unified and comprehensive insurance program administered expressly for the benefit of the dentists was now in full operation.

95 per cent participation

Since that time the plans have continued to grow, not only in size and cost savings but also in protection available to the dentist. Today, over 95% of the dentists in Canada participate in one or more of the plans offered by the Canadian Dentists' Insurance Program (CDIP). CDSPI itself has grown along with the expanding plans through enlarged offices, increased staff, and the in-house handling of all administrative procedures.

CDSPI's Board of Directors are drawn from the CDA and the provincial dental associations. Additional provincial input comes from the provincial Insurance Benefit Committees, whose Chairmen act as liaisons between CDSPI and the provincial members. Day to day operations of CDSPI are overseen by a three-person Management Committee appointed by the Board of Directors and carried out under the direction of a General Manager.

The Canadian Dentists' Insurance Program (CDIP) offers nine plans of insurance, covering the four basic needs of life, disability, office, and liability insurance. Each year a special package of insurance is offered to graduating students at no cost to them for the remainder of the year. This program guarantees the continued stability of the plan by encouraging the graduating dentists to participate in their own program from the beginning of their careers.

CDSPI also offers an information service, where toll free phone lines provide easy

access to information on the program and insurance in general. As an additional service, CDSPI will evaluate any insurance proposals or existing policies and provide a written commentary at no charge. This year CDSPI will also be embarking on a new program authorized by the CDA. The Loss Prevention Program is intended to help dentists prevent liability and malpractice losses through awareness and information.

Belongs to dentists

From the beginning, the Canadian Dentists' Insurance Program and CDSPI itself have belonged to and been controlled by the dentists of Canada through their national and provincial dental associations. Many dentists do not realize how unique CDSPI and its programs are. Through their Associations, the dentists have created a service organization (CDSPI) to provide for themselves the most extensive program of insurance benefits of any professional group. The strength of the program lies in these roots, for no one is better able to understand the needs of Canadian dentists and how best to fill these needs than the dentists themselves. Clearly then, the dentists of Canada have created and shaped CDSPI and its programs over the last 25 years. As CDSPI stands on the threshold of its second quarter century of service it is the dentists again who, individually and collectively, will determine the growth and direction of CDSPI in years to come.

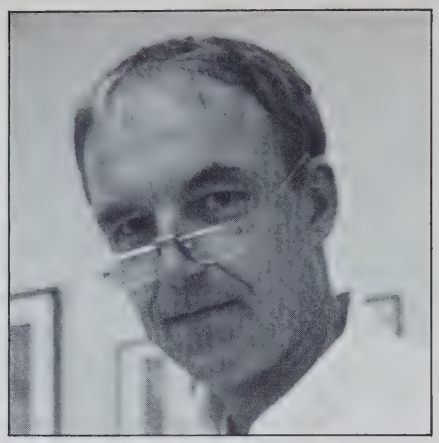
This article is intended to provide a brief summary of CDSPI's history and structure. A new pamphlet entitled "This is . . . CDSPI" provides more detailed information and is available upon request from CDSPI.

SPECIAL SCANDINAVIAN SESSION AT THE 1984 WORLD DENTAL CONGRESS IN HELSINKI

The local organizing committee together with the Periodontology Section of the Finnish Dental Society has prepared a special treat to those Congress participants who are interested in the latest trends in the treatment of periodontal disease.

A half day session called "The Scandinavian Way of Periodontal Treatment" will be held at 9.00 to 12.00 on Thursday the 29th of August in Hall A. The session will be chaired by Professor Jukka Ainamo (Finland) with Professor Asger Frandsen (Denmark) as co-chairman.

The first presentation is on "Treatment needs of periodontal disease" by Professor Jukka Ainamo, who is the past Chairman of CORE and presently Leader of the FDI/WHO Joint Working Group 1 on "Integrated Planning for Oral Health Services with Special Attention to Periodontal Disease".



Professor Jukka Ainamo

The second presentation, "Changing patterns of attitudes and oral health behaviour" will be given by Professor Asger Frandsen, Professor of Periodontology and former Dean of the Royal Dental School in Copenhagen who is well known to the periodontal profession as the editor of a series of text books mainly focusing on the prevention of periodontal disorders.

The third presentation is titled "Scientific basis of periodontal treatment", and will be given by Dr. Leena Saxén (Finland) who did her PhD on the prevalence and heredity of juvenile periodontitis. Dr. Saxén is presently Assistant Professor at the Department of Periodontology at Helsinki University.

The fourth presentation is by Professor Sture Nyman (Sweden) who currently is the acting chairman of the world famous Department of Periodontology in Gothenburg. Together with Professor Jan Lindhe, presently Dean of the School of Dental Medicine in Philadelphia, Dr. Nyman has during the last decade produced the most fascinating experimental research on the possibilities to regain lost periodontal attachment. These studies will be reviewed under the title "The regenerative potential of the periodontal tissues. A look into the future".

The final presentation, "Periodontally acceptable replacement of lost teeth" will be given by Professor John Silness (Norway) who is the Chairman of the Crown and Bridge Department at the University of Bergen. To periodontists and general practitioners interested in this field Dr. Silness may be best known by his Plaque and Gingival Indices, developed together with Dr. Harald Löe, presently Chief of the NIDR. Being originally a periodontist, Dr. Silness has produced a series of high quality studies on how prosthetic constructions should be designed not to cause damage to the periodontal tissues.

ASTRONAUT ORAL HEALTH CONSIDERED IN SPACECRAFT DESIGN

NASA scientists push for dental-medical operatories in planned facility

Houston — Space Station, the extraterrestrial research outpost on the drawing board at the National Aeronautics and Space Administration (NASA), will have its own dental and medical operatory if NASA planners adopt the recommendations of a group that has been studying the problems of performing clinical operations in space.

The Medical Sciences Space Station Working Group, a study arm of NASA, has included a designated treatment area for dental problems on Space Station in its recently filed preliminary recommendations. NASA anticipates a decision soon on when to start building Space Station.

The prospect of longer visits to space aboard the permanently-manned craft has raised the possibility of dental problems among crew members as in no other mission to date, with the exception of Skylab, according to Dr. William Frome, NASA dental chief. Crew members on Space Station could expect a tour of duty up to three months long. Dr. Frome has calculated that the risk of a crew member developing an inflight dental problem severe enough to hamper his or her effectiveness is approximately 1 per cent for every 90 man days in space. This is equivalent to a problem of that severity occurring once every 20-plus years for an adult in excellent dental health.

Dental problems likely to occur on space missions are similar to those experienced by a dentally healthy population on earth — toothache, periodontal abscesses, and fracture of a tooth in normal function, Dr. Frome said. Caries would not be a consideration because of the intensive dental preflight supervision of the astronauts. However, future crew members, drawn from the ranks of private citizens, whose dental histories have not been as thoroughly probed as those of the astronauts, would be at higher risk.

Will train clinician

Intensive training to develop dental clinical and diagnostic skills has been recommended for at least one Space Station crew member. "I would envision someone who has a background in biomedical science and who receives several months of training in dental procedures," Dr. Frome said. "He or she would probably have medical responsibility, too."

A problem discussed but not solved by NASA planners is that of performing dental and medical procedures in a zero-gravity environment. A dental and medical opera-

Artist's rendering of proposed dental- medical treatment facility on Space Station.

tory would have to include appropriate restraints for patient and clinician. The effect of zero-gravity on procedures involving considerable force such as tooth extraction, remains in question. Free-floating blood and saliva would further complicate dental operations.

Zero-gravity's effect on the action of local anesthetics is unknown, as is its effect on wound healing including bleeding and blood clotting. The study group has suggested that the extraction of an animal's tooth would be an ideal experiment for exploring this issue inflight, because "it is a benign procedure involving the manipulation of both bone and soft tissue," Dr. Frome said. To date, no experiments involving surgery have been conducted on US space missions.

While the constraints of operating in space would create problems for clinicians performing dental procedures, they could also provide advantages. "It may be possible to liberate ourselves from some of our earthbound traditions in treating patients," Dr. Frome said. In the absence of gravity, it would be possible to position patients for the maximum convenience of the operator (see illustration).

It is also hypothesized that in a zero-gravity environment the patient would be less prone to syncope, being always in an effectively prone position; and that anesthesia solutions would diffuse more uniformly in the tissue.

Current dental briefings

Astronauts currently receive a short preflight briefing on possible dental emergencies, and manuals describing procedures are always on board. One group of astronauts received rudimentary dental training. The three Skylab missions in 1973 and 1974 ranged from 28 to 84 days duration, so the nine Skylab astronauts took a two-day dental course at Lackland Air Force Base in San Antonio, Tex. The course consisted of lectures and slides in oral pathology and anatomy, administration of anesthesia, and tooth extraction. The astronauts later performed these procedures on volunteer patients, already scheduled for the indicated operations, under the supervision of a board-certified oral surgeon.

How did the astronauts perform at tooth extraction? "Some, with great enthusiasm," Dr. Frome recalled. Most of the patients were in turn enthusiastic about doing their bit for the space program, he added, with one, a retired Air Force general, returning to Lackland for three visits "because he wanted his teeth worked on by an astronaut."

The dental emergency kit that accompanies the astronauts contains a temporary restorative material that requires no mixing, eugenol, cotton, syringes, and bupivacaine hydrochloride. To date, the kit has not been used.

For their personal oral hygiene, the astronauts are provided with a soft-bristle toothbrush and dental floss. A special ingestible toothpaste developed for use in earlier flights, has been abandoned in favor of commercially available toothpaste.

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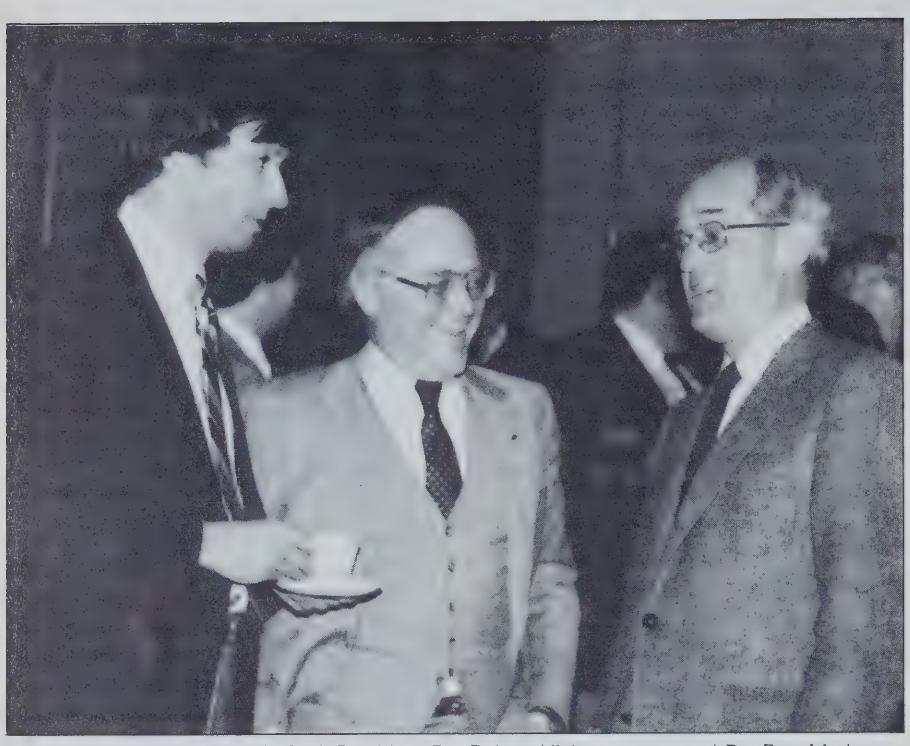
Briefly



Mr. Croft is seen right, with CDA President Dr. Robert Hicks, centre, and Dr. Ron Markey, President of the College of Dental Surgeons of British Columbia, left.

Mr. Ken Croft, managing director of the British Columbia College of Dental Surgeons is not only standing tall these days physically (matching such B.C. College colleagues as Drs. Ron Markey and Ted Ramage), but also in service and achievements for the Canadian Dental Association and the B.C. organization. He was congratulated at the ODQ-CDA Conjoint Convention in Montréal on reaching a milestone in his career — 25 years of service.

The first dean of the University of British Columbia's faculty of dentistry, Dr. S. Wah Leung, has retired from the faculty. He had served as professor in the department of oral biology since he retired from the deanship in 1977. He had been appointed as dean of the faculty in 1962.

He was responsible for recruiting the first faculty members, developing the first curriculum and for the planning of the building which houses the present Faculty of Dentistry at UBC.

On January 14 he was honored at a retirement dinner attended by members of the student body, the Alumni, present faculty and members of the practising profession.

British Columbia's College of Dental Surgeons sponsored the acclaimed American Dental Association marketing seminar in Vancouver on May 28. This presentation has been developed by the ADA to assist practising dentists to understand and apply the techniques of marketing to improve their practices.

The program is in response to the concern of organized dentistry that a large part of the population is still not receiving regular dental attention and in some areas, dental business has declined.

The day-long seminars are designed to assist the dentist to analyze his/her practice and to prepare programs of patient recall and communication that will revitalize existing practices and stimulate the growth of new ones. Seminar subject matter includes: How to apply business marketing strategies to dentistry, assess your practice's strengths and weaknesses, devise a game plan for building your practice, motivate your staff, generate patient referrals and, the *B.C. Dental Bulletin* reports, "much, much more!"

A Courtenay, British Columbia dentist, Dr. Steve Blackburn, has arranged to set up a dentistry assessment program on the tiny Pacific island of Kili, where there has never been any professional dental care.

The island is part of the Marshall Islands in Micronesia, about 1,000 miles west of Hawaii, just north of the equator.

He was invited by Dr. Graham Conway, a former Comox Valley (B.C.) physician who is now chief medical health officer for the Marshall Islands, a United States Trust Territory.

One of the biggest health problems on the islands is the lack of dental care, Dr. Blackburn says. "There's up to 2,000 people there and they've never had a dentist."

On most of the island, there is no electrical service and no dental facilities have ever been set up. Dr. Conway had to borrow a portable dentistry unit from another island for Dr. Blackburn to use, and portable electric power generators to power the unit.

Dr. Blackburn, who donated his time, said that he hoped the way would be paved for future visits by Canadian dentists because of the tremendous backlog of dental problems there.

Some of this backlog has been created under unusual circumstances.

Following the Second World War, the U.S. Government decided to use Bikini Atoll for atomic bomb testing and the inhabitants were relocated to Kili Island and given a continuing welfare program as compensation for the resettlement. But the Kili people are not particularly wise spenders. Much of their spare cash is spent on candy.

Keeping calm and thinking positive, soothing thoughts can help prevent caries and gum disorders, according to researchers at Temple University dental school and the University of Alabama.

Following analysis of the saliva of a group of dental students before and after a 20-minute meditation session, the Temple University research team found the saliva more watery, translucent and lower in harmful bacteria after the period of relaxation. It was concluded that salivary secretions have more potential to attack tooth enamel when the patient has been under stress, particularly chronic stress.

Vincent's disease, better known by the military term "trench mouth", was once thought to be caused mostly from unsanitary conditions on the battlefield. University of Alabama researchers have now discovered that the bacteria are not the only

cause. They state that stress in a battlefield environment aggravates such ailments. The researchers also have evidence that patients who have experienced negative and life-upsetting events, have much anxiety, depression and other emotional upheavals, often are beset with gum diseases.

National consumer magazines are helping to create awareness of dental health during the National Dental Health Month campaign, by publishing dental articles.

The current edition of "New Mother" magazine, published by *Chatelaine*, contains an article "All About Teething" for the guidance of parents with new babies. The article was written in consulation with Dr. Ian C. Bennett, Dean of the Faculty of Dentistry, Dalhousie University, President of the Canadian Academy of Paedodontics, and a member of CDA's Council on Education.

Excellent cooperation has been given to the NDHM across Canada through columns and stories in daily and weekly newspapers this year.

Previously CDA Council on Health Care had requested input into magazines for new mothers, and the publication "Best Wishes" accepted and printed an article prepared by CDA's information officer.

The magazine "Baby Talk" has also expressed an interest in publishing a similar article at a later date.

The Ontario Hospital Association newsletter reported recently that continuing education for health care professionals in that province will be getting a healthy financial boost from the province.

The Ontario Ministry of Health's Telemedicine project recently received $1.035 million from the province for its health education programs for health professionals in remote areas of Ontario.

The financial aid will be allocated over the next three years. After 1986-87, the project is expected to become self supporting through fees for programs and lending programs to users both in and out of the health care field.

The new programs will be made available to a greater number of hospitals than was possible before the increased financial aid.

During a discussion at the Conjoint ODQ-CDA Convention in Montréal in April about how far some CDA presidents must travel to attend the many CDA meetings in Ottawa, it was pointed out Past-President Dr. William R. Thompson was living in Ottawa and only had "three blocks to walk" to CDA headquarters building. Dr. Hicks, the present president, must fly in from Vancouver.

Dr. Thompson, somewhat amused by the reference to his "short walk," commented that "now I can come on my tractor."

The speaker appeared to be unaware that Dr. Thompson is now living on a farm near Trenton, Ontario.

A pocket sized folder containing capsulized information for health professionals on resuscitation procedures is now available.

Developed by Dr. William Hughes, training director of the Advance Cardiac Life Support (ACLS) program at McMaster University in Hamilton, Ontario, the folder is entitled "ACLS Pocket Protocols". It can be used as a handy and unique learning and memory aid for all branches of the health professions.

According to the Ontario Hospital Association newsletter, the brochures can be ordered for $1 (one to ten copies), 80 cents (11 to 50 copies) and 60 cents each for more than 50 copies. Contact: Barbara Cicero, McMaster Clinic Building, Hamilton General Hospital, 237 Barton Street, E, Hamilton, Ontario, L8L 2X2, telephone 416-523-1241.

Dr. Sam Green is at it again.

With the new slogan "Embrace Me" as its motto, Dr. Green has founded the "Smiling Faces with Braces Society of Canada," which will promote pride in one's appearance while wearing orthodontic appliances.

Dr. Green, the inventor of the "Tooth Fairy Society of Canada" and "Thumbsuckers Anonymous", among others, founded the Society to encourage brace wearers to smile in spite of sometimes embarassing orthodontic hardware.

"The Society wants to reverse the negative image and say 'smile, you're like thousands of others," said Dr. Green.

To gain membership in the Society, children are asked to write (in 32 words or less) why they have braces, why braces are needed or why healthy teeth are important. A button bearing the Society slogan, a pamphlet on special oral hygiene for people with braces and a membership in the Society are then forwarded.

For information, contact: the Smiling Faces with Braces Society of Canada, Etobicoke Community Health Department, Civic Centre, Etobicoke, Ontario, M9C 2Y2.

Dental practitioners in Québec were recently warned about a telephone soliciting swindle taking place in some parts of the province.

Thieves posing as either highly-placed government officials or company executives are telephoning dental offices in Québec, requesting dentists to provide a business card for the purposes of publicising office hours.

For the privilege of publishing office hours or a business card detailing that type of information, the dental practitioner is being requested to send a cheque for $75 or more. The newsletter "Dent pour dent" reports that in 99 per cent of the cases, both the business card and the $75 cheque disappear and the dentist receives no promised publicity.

The newsletter warns dentists in Québec, and across Canada, against accepting telephone solicitations of this kind or solicitation of business card information from itinerant salesmen.

The CDA's next convention will have an eastern flavour to it.

In late August or early September 1986, dentists from across Canada will gather in Halifax, Nova Scotia for the 1986 version of the Canadian Dental Association annual convention.

The last time the annual CDA convention was held in the Atlantic provinces was in 1980.

Beginning this month, the American Dental Association will have available patient information sheets on the dental use and possible side-effects of drugs commonly prescribed by dentists.

The first 10 drugs or drug groups which will be covered by the sheets are: acetaminophen, codeine combinations, erythromycin, fluoride supplements, diazepam, tetracycline, nonsteroidal anti-inflammatory drugs, propoxyphene, aspirin and penicillins. As the program goes on, more sheets will become available.

The goal of the patient information sheet program is to make patients more aware of potential, unwanted side-effects and to help them recognize these effects as being due to the medication. The sheets should improve communications between practitioner and patient and may increase compliance.

"We would hope patients are more likely to be satisfied with the treatment after receiving the sheets. The whole effort should strengthen communication between doctor and patient, with the ultimate goal of increasing compliance," said Dr. Kenneth Burrell, assistant secretary to ADA's Council on Dental Therapeutics.

The Council on Dental Therapeutics approved the use of patient information sheets in January. To obtain the sheets, contact the ADA, 211 E. Chicago Ave., Chicago, Ill., USA 60611.

Details of the annual World Health Organization (WHO) competition for fellowships for Canadian citizens wishing to undertake short term studies abroad were recently announced by Health and Welfare Canada.

Dentists and dental auxiliaries are among health care personnel eligible to apply. These engaged in pure research, undergraduate and graduate university students are not eligible.

Applicants for the fellowships will be rated by a Canadian selection committee on the basis of education, experience, field of activity, proposed area of study and the intended use of their newly-acquired knowledge.

The final decision for the award of a fellowship, as well as the proposed areas of study, rests with WHO.

Applications should be submitted before August 31. The application forms and any further information is available from: WHO Fellowships, Intergovernmental and International Affairs Branch, Department of National Health and Welfare, Brooke Claxton Building, Tunney's Pasture, Ottawa, Ont. K1A 0K9.

All professionals who have an influence over large populations should play a positive role in changing public attitudes toward alcohol and drugs, says Everett Chalmers, MD, chairman of News Brunswick's Alcoholism and Drug Dependency Commission (ADDC).

The Journal of the Addiction Research Foundation reports that Dr. Chalmers told a service club meeting in Fredericton that all professionals have "a moral responsibility" to deal with addiction problems in their employees, clients, or patients.

He also believed that doctors, nurses, clergymen, lawyers, business administrators, teachers and professors "should take a hard look at themselves and the curriculum of their alma maters." Regarding universities, he believed that the only thing they learn about alcohol and drugs was "how to drink and treat a hangover."

Unemployment and layoffs are aggravating the "empty chair syndrome," the President of the Manitoba Dental Association, Dr. Ted Hechter said recently.

Fewer people are going to the dentist because when their employment ends, they no longer have dental insurance coverage. The problem is compounded because the worker's family members are also foregoing their regular checkups and preventive care because without insurance, they no longer have the wherewithal.

Dr. Hechter believes this phenomenon has become more pronounced in the past two years because of the downturn in the economy.

The problem has struck particularly in the mining communities in northern Manitoba, where the workers have been heavily unionized, and part of the union package has always been dental coverage, he said.

A representative of a group of unemployed workers agreed that layoffs affect whether a person can afford to go to a dentist.

"In fact your priorities change when you're unemployed," he said.

Women in the United States continue to find dentistry an attractive career choice, and their numbers are on the increase in U.S. dental schools, an ADA Newsletter report indicated recently.

The number of first year women students enrolled in U.S. dental schools rose from 1,223 in 1982 to 1,313 in the fall of 1983. Twenty-five per cent of the total first year enrollment in U.S. dental schools are now women.

Ten years ago, women accounted for only four per cent of the total enrollment in dental schools south of the border, but today, they represent 22.1 per cent.

The American Dental Association's Bureau of Economic and Behavioral Research has launched its 1984 survey of dental practice in which questionnaires were mailed to 5,000 practitioners throughout the United States. Data supplied by dentists who voluntarily participate had proved to be an invaluable source of information about the characteristics and trends in the practice of dentistry, according to the Bureau director. Complete confidentiality is maintained and no survey information is released to other agencies of the ADA or outside groups.

The purpose of the survey is to provide national and regional statistics on the private practice of dentistry in the United States.

A United States dental school, at Temple University, Philadelphia, will begin this month to award a Doctor of Dental Medicine degree instead of the Doctor of Dental Surgery degree.

The Dean of the Temple University Faculty of Dentistry, Dr. Dale F. Roeck, said that "dentistry has changed to the point where there is now more emphasis on prevention and the total health care of the patient, rather than solely on surgical procedures for treatment of oral diseases. The dental medicine degree more accurately describes this emphasis."

Alumni of the University's dental school have been extended the opportunity to change their degree from DDS to DMD if they so wish.

The President of the United States is again seeking to impose a tax on employer-provided health insurance benefits, to raise revenue for that country's government. Observers in the U.S. have been quoted that they do not believe Congress will approve such a tax.

When President Reagan raised the possibility a year earlier, the American Dental Association and other health groups testified against the proposed legislation and the ADA separately urged each member of Congress to defeat such legislation. This time, however, the top officials of government have advised that it "deserves the very serious consideration of Congress."

The President has referred to the untaxed benefits as tax "subsidies". He said recently that "tax incentives promoting overly costly employee health insurance benefits would be revised to make users and providers more sensitive to costs." He said he believed that such "tax subsidy" had "stimulated excessive health insurance coverage and contributed to health cost inflation."

CDA Retirement Savings Plan

Unit values of the Canadian Dental Association's Retirement Savings Plan stood as follows on April 30, 1984.

Common Stock Fund	$73.44668
Fixed Income Fund	$38.11112
Guaranteed Fund	$28.35509
Balanced Fund	$15.17220

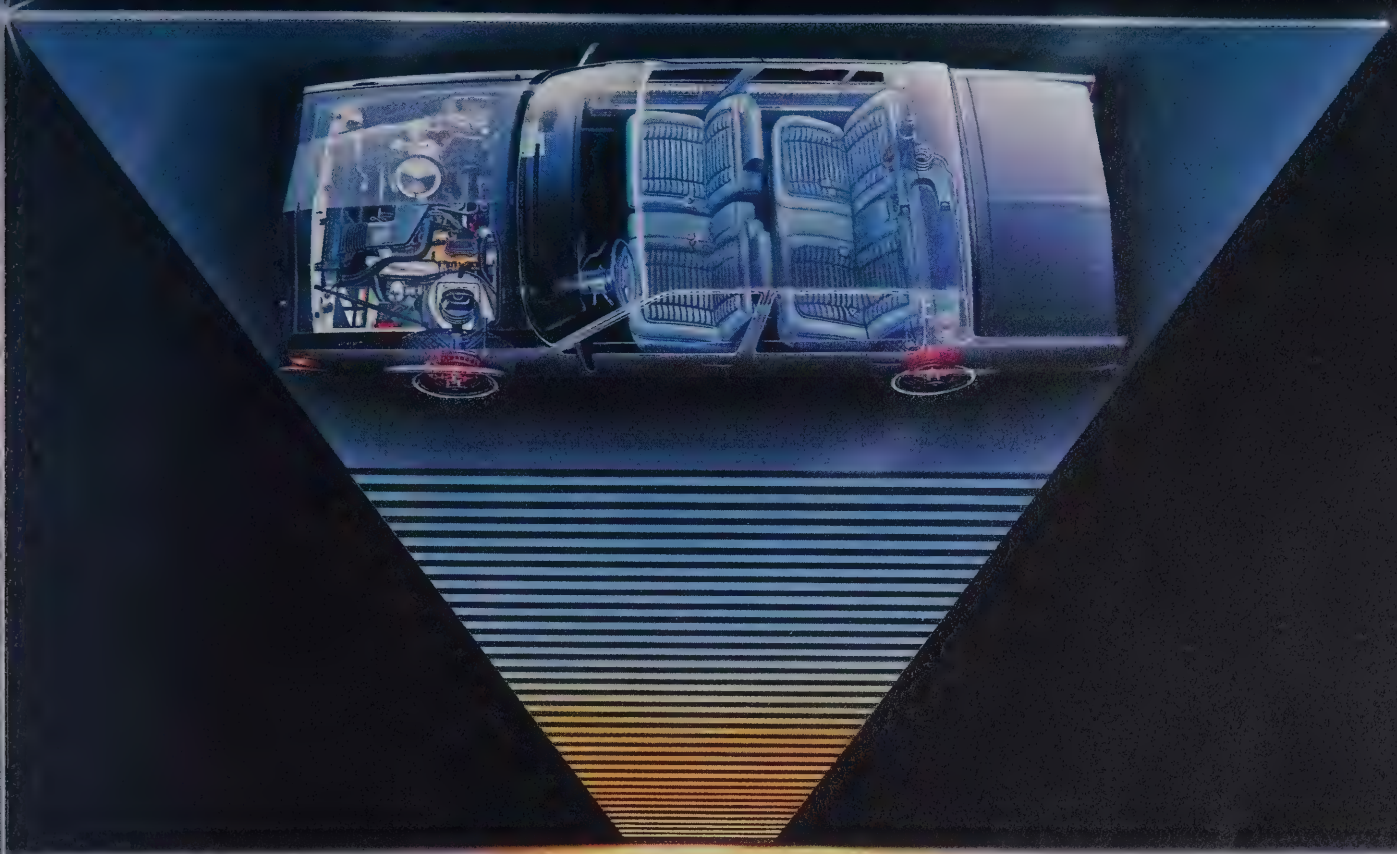
Total assets (market value) of the plan were $39,034,822.

The previous month's figures, as of March 31, 1984, stood as follows:

Common Stock Fund	$74.78591
Fixed Income Fund	$37.95126
Guaranteed Fund	$28.14477
Balanced Fund	$15.23445

Total assets (market value) of the plan were $39,281,522.

For further information write to: Canadian Dental Service Plans Inc., Ste. 600, 2 Lansing Square, Willowdale, Ontario M2J 4Z3 or call the central information services of CDSPI at 1-800-268-5418 (toll free number for Western Canada, Atlantic Canada and Ontario for Code 807 only, 1-800-268-3411 (toll free number for Quebec and Ontario except Code 807), and 497-7117 (Metro Toronto area).



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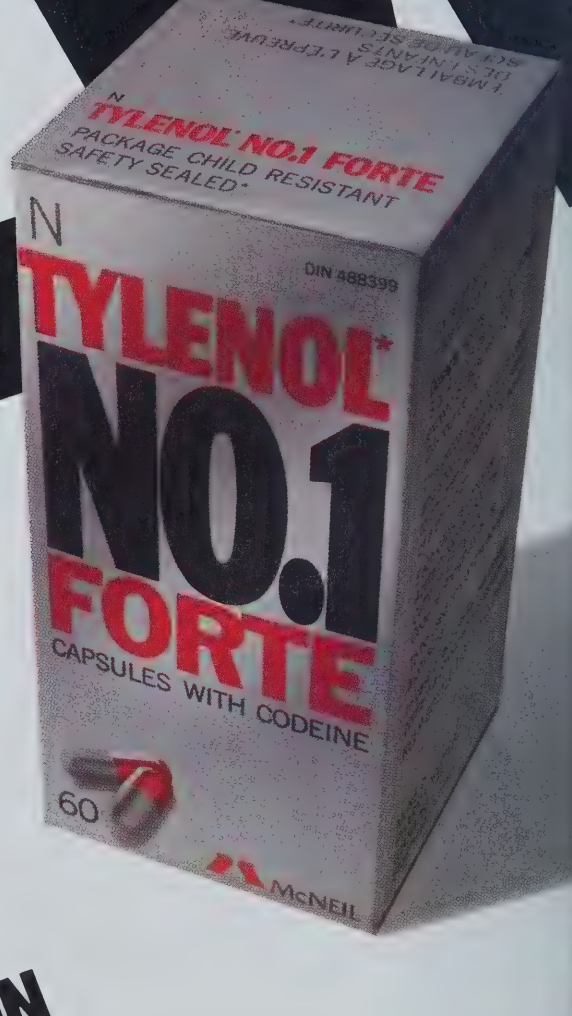

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Letters

IN REPLY TO DR. DUNN

I read with interest Dr. Wesley J. Dunn's article entitled "British Columbia's Medical Services Act — some disquieting implications" appearing in your January issue.

Though Bill 24 was allowed to die on the Order Paper in January, I feel a number of points raised by Dr. Dunn require comment.

First, Dr. Dunn implies that the distinction between medically required services and other prescribed services was somehow unique to this particular legislation. The fact is that this distinction is well established in Provincial and Federal legislation and nothing in that definition implied a change in policy. In B.C. the Medical Services Plan covers a range of services second to none in Canada of which we are justly proud.

Dr. Dunn makes much of the possibility that different classes of practitioners might have different payment schedules. Again, there is nothing new in that. In British Columbia payment schedules are negotiated with individual practitioner associations, including the College of Dental Surgeons, and nothing presently precludes differing payment schedules. Hardly an issue meritorious of rhetoric about the Charter of Rights and Freedoms.

Similarly, Dr. Dunn seems incredulous at the possibility that the Medical Services Commission might attempt to determine if a service provided by a practitioner was indeed a medically required (read insured) service. In fact, adjudication of claims is an intrinsic part of the operation of the Medical Services Plan, to do otherwise would be a complete abrogation of the financial responsibility of the Plan. Again, nothing new.

He also seems concerned about section 6 of the Bill with respect to referring inquiries to the College of Physicians and Surgeons. That section would have given the Commission no greater standing in referring matters to the College than that enjoyed by any three medical practitioners. Frankly, I would have thought all practitioners would applaud such standing.

Dr. Dunn also expresses reservations regarding provisions with respect to billing numbers. In British Columbia we believe we have a considerable and growing problem with an oversupply of medical manpower, particularly in the urban areas of the Province. For illustrative purposes I note that Canada has a population per civilian physician ratio of 617:1, British Columbia 538:1, Greater Vancouver 405:1 and Greater Victoria 387:1. By any reasonable yardstick we have a problem, and a costly one. We are working cooperatively with the B.C. Medical Association, the College of Physicians and Surgeons, the B.C. Health Association, the University of British Columbia School of Medicine and the Professional Association of Residents and Interns through our Provincial Medical Manpower Committee to ensure the system we develop is both fair and equitable. Hardly Orwellian!

Dr. Dunn also points to the broad Regulatory authority which would have been provided in the Bill. While of course he is free to make conjectures about what the Regulations might have been, in fact, the Regulation making authority under the existing legislation is no less broad, indeed it is not limited through the "shopping list" approach taken in the Bill which is much more the current drafting style.

With respect to private insurance, the provision in the Bill continued a similar provision in the current Regulations.

Dr. Dunn, while correctly summarizing some aspects of the Bill, unfortunately appears to have all but ignored the existing Acts and Regulations in drawing his conclusion about the purposes of the Bill. Otherwise he would have known that much of what he perceived as change was not. Nor did Dr. Dunn, so far as I am aware, make any effort to check his facts and assumptions with me, any of my staff or for that matter, the British Columbia College of Dental Surgeons, with whom we did consult on the Bill.

James A. Nielsen
Minister of Health
Province of British Columbia

HEALTH ACT WILL RESTRICT FREEDOM OF CHOICE

As we well know, the current health legislation in Canada is about to undergo dramatic changes. The most publicized change would restrict the private physician from "opting-out" of Provincial Medicare and "extra-billing", or more appropriately to individually set fees.

Fee for service has been a tradition in medicine and dentistry for some time now. As well, each practitioner traditionally has set his or her own fees based on location, overhead and perceived skills. Some degree of free enterprise, as it stands now, still rewards initiative; however, legislated fees and methods of practice can only reduce our excellent health care to a mediocre level. Practitioners must remain free to determine their individual method of health care delivery; as well, patients must have a freedom of choice in their search for individualized health care.

As dentists, we must realize the confrontation the medical profession is about to have with the Federal Ministry of Health is the same confrontation dentistry may well have in ten years: the only difference being that the decision will have been made for us.

For this reason, I believe it imperative that the Canadian Dental Association and Provincial Associations should seriously consider the problem and support the position taken by the C.M.A.

As **Canadians**, I am sure we are all too aware of how Government Agencies and Crown Corporations operate. Medical care cannot tolerate the level of mediocrity achieved by these organizations.

Please colleagues, remember the same people who brought you Canadair, Petrocan, Via Rail, Canada Post and Revenue Canada may soon bring you your only health care choice,

Richard D. Speers, DDS
Toronto, Ontario

EDITOR'S NOTE

On Thursday, February 23, 1984, a CDA delegation headed by Dr. Robert Hicks presented a brief on the Canada Health Act to the House of Commons Standing Committee on Health Welfare and Social Affairs. The brief addressed several concerns related to the Act, and did point out that the punitive provision of Section 18 (which would punish provinces prohibiting extra-billing) was a negative step in more ways than one. This provision would make it impossible for the Dental profession to continue to place emphasis on the "co-insurance" principle as part of its program promoting prevention of Dental illness. The April, 1984 CDA Communique presents further details.

PROBLEMS WITH REPORT ON PERIODONTICS

I read Harvey Freedman's article, "Periodontics — So What's New?" with some interest. He is to be congratulated for attempting to review a most difficult topic. The problems encountered by the reader, however, are compounded by some misinformation which crept into the printed text.

Under the sub-title "Amoebae and Periodontal Disease" I must rebut the impression the article created that I have found Entamoeba histolytica in plaque. This parasite is the cause of amoebic dysentery and other disease but is easily differentiated from E. gingivalis, which was the subject of the paper he quotes.

Likewise his reference to "Treponema" (? pallidum?) a genus of spirochaete: the other parasite to which I have referred is Trichomonas tenax which is a protozoan flagellate parasite many thousands of times larger than a spirochaete.

The difference in size between the protozoa and the bacteria of the plaque, of course makes a mockery of the numbers game. Due to the disparity of size the obvious comparison one would have to make would be wet weight or destructive potential assessed by identification of antigen and other noxious metabolites or metabolic by-products.

His reference to relative numbers of E. gingivalis found in a periodontal pocket is again misleadingly low. Those of us who routinely examine plaque for protozoa know that in a case of moderate disease one 400 power field may have eight to ten amoebae present. This viewing area represents just one four hundredth of the total plaque sample on the slide. Allowing for the fact that not all fields will have that many amoebae a conservative estimate for a single infected pocket would be in the one to four hundred range. With twenty eight teeth, all periodontally involved, the total number of disease sites could be well over fifty six. The potential for ill health can then be calculated from the appended (unpublished) report.

I am not at liberty to comment on a personal communication from Socransky to Freeman, especially when there is no direct quotation, however modified Iron Haematoxalin staining procedures are routinely used in thousands of commercial and public health laboratories to diagnose intestinal parasites in stool. It was from these technologies that our technique for confirming the presence of E. gingivalis in plaque was developed. Technologists in medical laboratories do not seem to have much difficulty with the technique, in fact it can even be used to train technologists to spot and identify protozoa in plaque, before moving on to more complex stool samples. I do not think that the average dental researcher would have that much difficulty with the technique. In fact, I am sure hygienists would be more than capable.

Finally I must refer to Freeman's quotation of Socransky on the subject of Emetine hydrochloride, commonly referred to as Emetine. Socransky has indeed published his view on this drug in "Host-Parasite Interactions in Periodontal Diseases", Chapter One, page two, bottom of second paragraph. Although he states (and Freeman repeats) that Emetine has anti-inflammatory properties more than twelve texts on pharmacology, (including pharmacoepias,) do not agree with these two gentlemen on the subject of the pharmacology of Emetine. In short, Emetine hydrochloride, (Emetine), apart from being noted as an emetic is an alkaloid derived from ipecacuanha. It irreversibly inhibits protein synthesis and causes redness, irritation and blistering if rubbed onto the skin. It has been used as an emetic, an expectorant, a diaphoretic, (not to be confused with an anti-inflammatory,) an appetite stimulant and an amoebacide. Its use is not without risk, however, since it has been known to cause a complete cardio-vascular collapse, even when used topically.

Since the article which I co-authored has been so badly misquoted, I hope that you will find some space in your excellent Journal for the corrections to be printed.

In addition to the above your readers may find the following of some interest: Report on the Feeding Habits of Entamoeba gingivalis.

Observations on the protozoan parasite, Entamoeba gingivalis, which I believe have never before been made, which may be considered to make it unique among parasites and protozoa, which should dispel any doubts about it being a pathogen and which may have implications which extend far beyond the oral cavity.

The organism was observed (and video taped) in dental plaque, mounted in the patients own saliva, using a phase contrast microscope.

A number of E. gingivalis were observed to repeatedly "attack" living polymorphs, insert a finger like projection of cytoplasm through the cell wall of the leucocyte, liquefy the nucleus, "suck" the liquefied nucleoprotein down into the body of the amoeba, where it instantly became "the partly digested remains of a leucocyte nucleus in a food vacuole". The amoebae then withdraw the "proboscis" and seal the cell wall of the white blood cell, leaving a denucleated cell behind. Individual amoebae were repeatedly seen feeding on as many as four blood cells simultaneously. From observation it would appear that one E. gingivalis is capable of consuming at least twenty blood cells per hour.

In addition to this, two additional feeding mechanisms were observed:

In the case of erythrocytes, E. gingivalis was observed "sucking" out the cell contents until the only remaining part of the cell was the cell membrane. The parasite also appeared to partly empty other red cells, the process obvious from thin black line emanating from the junction of cell membranes into the body of the amoeba, but the amoeba detaching itself before the red cell was completely drained. Again, apparent closure of the "wound" was observed. E. gingivalis was also observed "swallowing" globules of leucocyte cytoplasm after penetration of the cell wall. Again the cessation of the feeding cycle on the affected blood cell was accompanied by closure of the cell wall so that no leakage was seen to occur when the amoeba detached itself.

It seems that the feeding habits of E. gingivalis have previously been misunderstood and that this may have led to an underestimation of its pathogenicity.

Dr Trevor Lyons
Ottawa, Ontario

Publications by Lyons, Scholten, Palmer & Stanfield: "Oral Amoebiasis:" (followed by a subtitle,) Dentafacts, July 1980; Oral Health, Oct 1980; Ontario Dentist, Feb 1982; Quintessence International Dental Digest, Dec 1983. Plus many presentations at professional meetings & etc.

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1. Blum, J. and Kranz, S. *Operation mouthguard: a model program designed to prevent dental trauma*. ASDC Journal of Dentistry for Children, v. 49, no. 1, January-February 1982, pp. 22-24.
2. de Wet, F.A., Badenhorst, M. and Rossouw, L.M. *Mouthguards for rugby players at primary school level*. Journal of the Dental Association of South Africa, v. 36, no. 4, April 1981, pp. 249-253.
3. de Wet, F.A. *The prevention of orofacial sports injuries in the adolescent*. International Dental Journal, v. 31, no. 4, December 1981, pp. 313-319.
4. Everett, M.S. *Mouth protectors*. Dental Hygiene, v. 56, no. 2, February 1982, pp. 27-33.
5. Garabee, W.F., jr. *Craniomandibular orthopedics and athletic performance in the long distance runner: a three year study*. Basal Facts, v. 4, no. 3, Summer 1981, pp. 77-81.
6. Goldstein, G.R. and Katz, W. *Divers mouth syndrome*. New York State Dental Journal, v. 48, no. 8, October 1982, pp. 523-525.
7. Hughston, J.C. *Prevention of dental injuries in sports (editorial)*. American Journal of Sports Medicine, v. 8, no. 2, March-April 1980, pp. 61-62.
8. Nicholas, N.K. *Dental injuries in primary and intermediate and school children*. New Zealand Dental Journal, v. 76, no. 343, January 1980, pp. 8-11.
9. Nicholas, N.K. *Mouth protection for children*. New Zealand Dental Journal, v. 78, no. 352, April 1982, pp. 62-64.
10. Nicholas, N.K. *Rugby dental injuries (letter)*. New Zealand Medical Journal, v. 95, no. 710, June 23, 1982, p. 437.
11. Rossouw, L.M. and de Wet, F.A. *Mouthguards — pressing on towards perfection*. Journal of the Dental Association of South Africa, v. 36, no. 10, October 1981, pp. 707 and 710.
12. Schwartz, R. and Novich, M.M. *The athlete's mouthpiece*. American Journal of Sports Medicine, v. 8, no. 5, September-October 1980, pp. 357-359.
    Abstract: This article points out several needs. The first is the need to have research on the design of the athlete's mouthpiece. This study demonstrates that the most frequently used athlete's mouthpieces alter the relationship of the lower jaw to the upper jaw. Second, this article expresses the need for design change in the present mouthpiece. It shows statistics that indicate a design change could be very advantageous to the athlete's performance. A strong case is made for viewing the mouthpiece as an aid as well as a protector.
13. Scimone, F.S. *Effect of a mouth appliance on athletic performance*. Journal of the Massachusetts Dental Society, v. 30, no. 3, 1981, pp. 156-158.
14. Smith, S.D. *Adjusting mouthguards kinesiologically in professional football players*. New York State Dental Journal, v. 48, no. 5, May 1982, pp. 298-301.
15. Thompson, B.D. *Protection of the head and face*. Dental Clinics of North America, v. 26, no. 3, July 1982, pp. 659-667.
16. Upson, N. *Dental injuries and the attitudes of rugby players to mouthguards*. British Journal of Sports Medicine, v. 16, no. 4, December 1982, pp. 241-242.

One copy of the above articles is available at no charge from the library to all CDA members. Non-members will be charged $5. This bibliography was generated with the help of MEDLARS, a computerized information retrieval system for the Health Sciences field, which has been operational in the library since February 1982, and is at the disposal of all members.

La bibliothèque de l'ADC offre gratuitement à ses membres et pour $5 aux non membres une copie des articles au-dessus. Cette bibliographie a été préparée avec l'aide de MEDLARS, un système informatisé de recherche bibliographiques pour les sciences de la santé. Ajouté à la bibliothèque en février 1982, ce système est à la disposition de tous les membres.

NEW LIBRARY ACQUISITIONS

TITRES EN BIBLIOTHÈQUE

The following current acquisitions are available on loan from the Resource Centre/Library.

Les titres indiqués ci-dessous sont maintenant disponibles à la bibliothèque/centre de documentation de l'ADC.

1. Bishop, Eric. *Dental Insurance: the What, the Why, and the How of Dental Benefits*. Toronto: McGraw-Hill, 1983, 253p. 1 copy.
2. Peat, Marwick and Partners. *Western Canada Health Manpower Training Study*. 1983.
   - Section 1: Executive Summaries and Section II: General Study Reports. 5 copies.
   - Section III: Category 1: Reports: Optometry, Chiropractic, Podiatry/Chiropody, Ophthalmic Dispensing, Certified Prosthetists and Orthotists. 1 copy.
   - Section III: Category 2: Reports: Dental Laboratory Technicians, Dental Mechanic, Dental Nurse, Public Health Inspector, 8 copies.
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   - Section III: Category 4: Reports: Registered Nurses, Psychiatric Nurses, Nursing Assistants. 1 copy.
   - Section III: Category 5: Reports: Physicians. 1 copy.
3. Snyder, Thomas L., ed. *Personalized Guide to Computers and Your Dental Practice*. Toronto: Mosby, 1984. 208p. 1 copy.

Book Reviews

ORTHODONTIC DIAGNOSIS

W.J.B. Houston

Wright PSG Inc.
Bristol England
$15.00, 123 pp.

This publication is the third and latest edition of **Orthodontic Diagnosis**, published as one of the series of Dental Practitioner Handbooks. The author's aim of presenting a simple and comprehensive approach to orthodontic diagnosis that can be applied to everyday practice has been achieved. The information contained in this handbook is essential not only for those practitioners who desire to become involved in orthodontic treatment, but the principles related here should be a part of the examination of certainly every child and any adult whose occlusion deviates from accepted limits. It would be safe to say that the information presented here is a prerequisite for undertaking even the most simple orthodontic corrections or starting any patient on a program of serial extractions. The handbook starts with a description of the concept of normal occlusion and how this relates to the theoretical ideal.

Also covered in this description is the development of the normal occlusion from infancy to the adult dentition. It is only by understanding the concept of normal occlusion that the rationale for treating malocclusions can be developed.

Following this initial chapter, Dr. Houston goes on to describe the types of malocclusions that would be encountered in dental practice. The attention that the author gives to the detail of the various types of problems that are encountered cannot help but make the practitioner or student more appreciative of the interrelationships between dental, osseous and soft tissues.

The chapters on facial growth and cephalometric analysis are unique to this third edition and even though cephalometric x-rays may be beyond the scope of the general practitioner, an understanding of their use would be beneficial for both student and graduate. The soft tissue morphology and the relation of the malocclusion to muscle activity is covered quite well, as in the functional aspects of normal and deviant occlusion.

Of value to any practitioner would be the orderly sequence presented in the chapter on Intraoral Examination. The information contained here would be an appropriate guide for the examination of any candidate for minor or extensive orthodontic treatment.

This is a relatively short handbook and can be easily read in two evenings. The information contained within the eleven chapters would give any student or practitioner a sound background with which to approach minor orthodontic treatment. The handbook is a good starting point and with this background, more detailed information could be sought in other orthodontic texts.

Since the majority of patients requiring orthodontic treatment have relatively simple malocclusions, the careful diagnosis and treatment planning concepts given in this book would enable the practitioner to treat those cases in his office where skeletal and soft tissue problems are not present.

The author's style is quite straight forward and his text is logical and easy to read. I feel that this book meets the objectives set by Dr. Houston and would be a good starting point for those interested in orthodontic treatment.

This book was reviewed by
Dr. James T. Flynn
St. John's, Nfld.

HANDBOOK OF FACIAL GROWTH

D.H. Enlow

Second edition 1982
W.B. Saunders Co.
Philadelphia, PA.
$36.85, 486 pp.

Dr. D.H. Enlow, chairman of the Orthodontic Department at Case Western Reserve University in Cleveland, Ohio published the first edition of the Handbook for Facial Growth in 1968.

Each chapter in the Handbook (there are thirteen) is divided into two parts, Part I is intended for the undergraduate dental student while Part II of each chapter would be beneficial to those at the graduate level or in specialty programs. The book would be useful for plastic surgeons, prosthodontists and of considerable interest to the teacher and student alike.

Some of the chapter titles include edentulous arches, control processes in facial growth, the plan of the human face, and an excellent chapter on Cephalometrics.

The chapter on the Facial Growth Process includes the following comments by the author:

"The multiple growth processes in all the various parts of the face and cranium are described separately as individual "regions" or "stages". The sequence will begin arbitrarily with the maxillary arch. Changes are then shown for the mandible followed by growth changes in parts of the cranium and then those of the other regions, one by one. It should be kept in mind that these regional growth processes all take place simultaneously, even though they are presented here as a sequence of separate stages."

Dr. Enlow discusses several sacred cows in his book such as Mandibular Rotation, Condylar Growth and mesial drift versus vertical drift regarding growth. These controversial topics are discussed in the light of new and interesting scientific information.

One unusual aspect of the book are the outstanding diagrams, photos and charts. For every page of text there is one page of diagrams, photos and illustrations.

To anyone interested in facial growth and everyone in dentistry should be, whether specialist, general practitioner or student the volume is highly recommended by this reviewer.

This book was reviewed by
Michael J. Cripton, DDS
Moncton, N.B.

COLOR ATLAS OF HEAD AND NECK ANATOMY

R.M.H. McMinn, R.T. Hutchings, and B.M. Logan

Year Book Publishers Inc.
Chicago, U.S.A.,
240 pages

The purpose of an atlas of human anatomy is to guide the beginning student through the dissections of the various regions of the body. The atlas should provide a preview of the structures prior to undertaking a dissection and then aid in verifying the structures once they are found. Unfortunately, when proceeding to deeper structures, the superficial structures so laboriously found and cleaned must be sacrificed so the atlas must also provide the

OBITUARIES/NÉCROLOGIES

CARSON, E.H.: Dr. Carson, a resident of Toronto, Ontario, was born in 1904. He graduated from the University of Toronto in 1943.

DECKER, GEORGE E.: A graduate of the University of Alberta in 1932, Dr. Decker was born in Balcarres, Saskatchewan in 1909. A one-time secretary registrar of the Alberta Dental Association, Dr. Decker also served on the CDA's Council on Ethics and Council on Education. He was a life member of the Canadian Dental Association and a Fellow of the International College of Dentists.

GRENIER, L.-D.: Né en 1926, le Dr Grenier a été diplômé à l'Université de Montréal en 1953. Au moment de son décès, il habitait à Coaticook, Québec.

HOPKINS, HENRY TOOLEY: A practicing dentist in Calgary Alberta until his death, Dr. Hopkins was born in 1918 in Battleford Saskatchewan. He graduated from the University of Alberta in 1951.

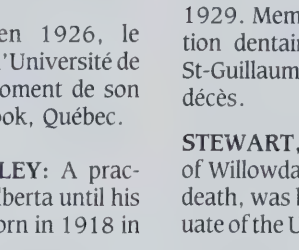
LARGE, V.H.: A life member of the Canadian Dental Association, Dr. Large was born in 1902. He was a graduate of the University of Toronto in 1925.

PATZALEK, H.A.: A resident of Hamilton, Ontario at the time of his death, Dr. Patzalek was a graduate of the University of Toronto in 1946.

SAINT-GERMAIN, GUY: Né en 1903, le Dr Saint-Germain a obtenu un diplôme en dentisterie à l'Université de Montréal en 1929. Membre permanent de l'Association dentaire canadienne, il habitait à St-Guillaume, Québec, au moment de son décès.

STEWART, D.L.: Dr. Stewart, a resident of Willowdale, Ontario at the time of his death, was born in 1935. He was a graduate of the University of Alberta in 1958.

THIS IS NOT GOING TO HURT ONE LITTLE BIT...



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student with a permanent reminder or a review of what had been achieved in the dissecting laboratory. The illustrations, therefore, must be truly representative of the dissected human specimen.

Currently available atlases are illustrated in a variety of ways ranging from highly schematic and idealistic renditions by medical illustrators to partially coloured tracings of photographs. The Color Atlas of Human Anatomy by McMinn and Hutchings represents an entirely different approach and uses life-size colour photographs rather than artists' renditions to illustrate the various regions of the body. The same authors have also produced the Color Atlas of Head and Neck Anatomy intended as a general atlas for those students interested only in head and neck.

The advantages of the photographic approach are many. The life-sized illustrations are an accurate reflection of the student's laboratory encounters. In addition, the structures are labelled by number with adjacent legends that aid the student considerably for review purposes. The section dealing with the skull and its component bones, a topic missing from most atlases, is well laid out and beautifully photographed. The colour photographs of the dissections, paradoxically, lack a range of colour and this is not the fault of the authors but rather reflects the monochromic appearance of cadaveric material. Imparting a yellow cast in the processing of the photographs gives the illusion of colour but does little to help the beleaguered student distinguish between vessels and nerves especially in the busy, complicated dissections. Perhaps a compromise is called for in that at least vessels and nerves be colour-coded by either painting the structures prior to photography or adding the colour to the final print. This would aid the student immeasurably.

Based solely on content or lack of appropriate content rather, this atlas is not suitable for dental students. The atlas lacks sufficient material on infratemporal structures, vascular and nerve supply to the teeth and supporting structures and intraoral topography. An atlas devoted entirely to head and neck is not sufficient for a modern dental undergraduate programme which should include thorax and abdomen as well as at least an overview of the limbs. In addition no attempt is made to integrate clinically relevant information. I would not, therefore, recommend this atlas as a required item for undergraduate or postgraduate students of anatomy but it should be consulted as a reference atlas, particularly for its excellent section on osteology.

This book was reviewed by
Dr. Bernard Liebgott
University of Toronto

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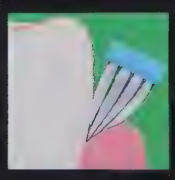

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COMPUTERS AND THE DENTIST

By Alan Veldman and Stephen M. Yolleck

An Introduction

Over the past few years, the micro computer has made it financially possible for small businesses to computerize their operations. Initially the programs available were limited to accounting, inventory control, billing and record keeping.

Now, specialized packages are continually arriving on the market. Some of these are for dental practices. Because these new packages all have different features, you must be able to evaluate intelligently. What you think you are getting and what you actually get, may be two different things. In this series of articles we intend to guide you through this evaluation process.

There are advantages and disadvantages in computerizing your practice. Listed below are four common problems with a computer installation. These can be avoided if you do your homework before you buy a system.

1. **The programs do not meet your needs:** This problem occurs time and time again. This is usually because of a lack of understanding of your requirements by the software vendor. The result is an unhappy installation and a waste of time and money. You can eliminate this problem by defining your needs accurately. This will be outlined in the next article.
2. **Training:** Good training is essential. A program may work well, but if you do not fully understand how to operate the hardware or software, problems can follow. These can be very expensive. Good training manuals and instruction on the hardware will help eliminate this problem.
3. **Attitude:** Both you and your staff must feel confident and positive about the new system. it is going to involve a lot of extra time in the beginning. If your staff rebels against the system, it is doomed from the start.
4. **Ease of use:** A computer with a sophisticated, well written program, may do everything. But if it is not easy to use, it isn't much good. You will find that your staff will not use the system.

Those are a few of the problems that can easily be avoided if the proper steps are taken.

There are many obvious advantages to having a computer system. Outlined are three main benefits of computerization.

1. **Save time and money:** The immediate benefit is the time saved in billing and updating patient accounts. During heavy work load periods, a computer system can reduce the possibility of mistakes, relieve tension and ensure that billing is done correctly. A good system will provide the operator with a series of checks and the system will not allow the operator to skip over important information. There are measurable savings, especially if your practice grows. You will not need to hire additional staff in order to handle the increased work load.

   Accounting fees will also be reduced if you have your accounting data in your computer.
2. **Increase your income:** A computer system is well suited to a "marketing" function. When a word processing system is integrated with your patient files, recall letters, collection letters or general goodwill letters are easily produced and sent out without a great expenditure of time and money.

   Recall management is also becoming more and more important in today's dental practices. A recall system in your computer will provide your staff with easy inquiry responses or reports. The system will not allow a recall to go unnoticed. Accounts receivable control is probably the most often mismanaged and time consuming task in the dental office today. Small receivables have a habit of going unnoticed and consequently they are lost. A computer system will give all receivables, large or small, the same degree of prominence. That is, a $5 receivable will show on the aging report in the same manner as the $2,000 receivable.
3. **Management control:** Management control is essential to the operation of any business. The sooner the information is made available, the more valuable it is to the practice. Statements, accounts receivable, tracking performance and statistical reports, are all easily generated.

After considering the pros and cons of a computer system, there are a few points yet to consider before you take the next step.

1. A single practice should be prepared to spend between $6,000 – $12,000 for a micro computer and from $5,000 upwards for a software package.

   A custom software package will cost even more. In addition, there are hidden costs such as start up time, converting from your manual system, and training your staff.
2. Do your homework! Determine your needs before you seek out a system.

Take a look at the various software packages on the market. How to evaluate these software packages and determine your needs, will be explained in the next article.

3. Make sure your staff is prepared to accept the challenge of a new system.

4. Look at the service and reliability of both hardware and software. A company should offer you comprehensive service. Down time can be very expensive, especially if you have to wait a day for support.

In the next four articles, we will make reference to some common computer terminology. Below is a listing of some of the more common terms:

BINARY Computers work only with binary numbers, made up of 0's and 1's. They are generally called "Bits."

BYTE The Bits are grouped together into "Bytes." Eight bits make one Byte. One Byte is the same as one character i.e. A, B, C, etc.

CRT Cathode Ray Tube. This is the display screen or monitor. There are two types: monochrome and color. The color may receive its signal in a combined form called "composite", or separated into red, green and blue ("RGB")

COMPILER Programs written in higher languages such as Fortran or Pascal are called "source code." The same language translated into machine instructions is called the "object code." The compiler translates the source code into object code.

DOT MATRIX The type of printer most commonly used. It is generally the cheapest printer on the market. The characters are formed by a series of dots. The composition is generally good but not as good as a "daisywheel" printer, which provides typewriter-like print.

FILES A file is where the computer stores information such as patient data and procedure code information. These are also called master files.

HARDWARE The actual computer itself and all the peripheral mechanical parts. This includes the printer, drive, monitor, etc.

INTERFACE This is the connection between two parts of the computer – i.e. connection between the computer and the printer.

K Computer memory is usually referred to in units of 1,024 characters or bytes. K stands for "Kilo," 64K stands for approximately 64,000 bytes (in fact, it is 65,536 bytes).

OEM Original Equipment Manufacturer. This refers to a company which markets hardware made by another company under their own name.

OPERATING SYSTEM The program that supervises and controls the operation of a computer. Two of the most popular operating systems are MS-DOS and CP/M.

PROCESSOR The "brain" of the computer. It is the part of the computer that interprets the programs, and performs the instructions sent to it. Two of the most popular are 8088 (IBM PC) and the 6502 (APPLE, COMMODORE).

RAM Random access memory. You can both read and write information into RAM. It is the main memory of the computer.

ROM Read only memory. You can read information stored into ROM, but you can't write to it. This is where the computer keeps important system information.

SOFTWARE The programs that make the computer run. This includes the "operating system" (See above), and the application software (or what you would call "packaged programs" such as word processing, etc).

*Alan Veldman is president of Bask Computer Systems, Inc. **Stephen M. Yolleck** is chairman of Bask Computer Systems Inc., and President of Yolleck and Wyemouth Ltd., a custom programming house specializing in the IBM product line of computers. Bask Computer Systems Inc. specializes in dental and medical computer systems for IBM computers, and medical and dental consulting for single or clinic practices.*

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COMPUTERIZED DENTISTRY IS PAINLESS?

Donald Gutkin, DDS,
Winnipeg, Manitoba

INTRODUCTION

Dr. Donald Gutkin and his partner, Dr. Ben Goldberg, own and operate the McPhillips Dental Health Centre in downtown Winnipeg, Manitoba.

The following article, written by Dr. Gutkin, consists of first hand experience concerning the computerization of a general dental practitioner's office.

The two dentists have given many seminars at the University of Manitoba, in conjunction with Dr. F. S. Chebib, biostatistician at the dental school, to inform dentists of the systems available on the market. They have also given talks in many communities in Manitoba and other parts of Canada on the subject of computerization.

Dr. Gutkin became involved in this field about two years ago, and his health centre, operated by a staff of three dentists, three hygienists and three Phase II assistants, has been actively using its own micro computer for one and a half years.

"Many hours of work were spent on studying the problems and differences arising from computerized processing of dental claims, statements, etc. All these had to be worked out with the Manitoba Dental Association, the Canadian Dental Association and respective committees that negotiate with The Canadian Life and Health Insurance Association. Procedural guides required modification to adapt to computerized input procedure. This required becoming a member of the third party committee and meeting with the economics committee. Together, we have solved many of the associated problems."

Dr. Gutkin says that he takes time out from the computer to be a full-time dentist. He has been in general practice for 10 years. He was a dental school graduate of the University of Manitoba in 1973.

Dr. Donald Gutkin, left; the author of this article, is seen at the computer keyboard, while his partner, Dr. Ben Goldberg, looks on.

AVANT-PROPOS

Le Dr Donald Gutkin et son collègue, le Dr Ben Goldberg, possèdent et gèrent un centre dentaire, le McPhillips Dental Health Centre, *au centre-ville de Winnipeg, au Manitoba.*

Rédigé par le Dr Gutkin, cet article relate les premières expériences du dentiste qui procède à l'informatisation de son cabinet.

De concert avec le Dr F.S. Chebib, biostatisticien à l'École dentaire de l'Université du Manitoba, le Dr Gutkin et son collègue y ont donné plusieurs séminaires afin de renseigner les dentistes touchant les ordinateurs offerts sur le marché. En outre, ils ont tenu de nombreuses causeries sur le même sujet au Manitoba et ailleurs au Canada.

Le Dr Gutkin a commencé à s'intéresser aux ordinateurs il y a deux ans. Le centre dentaire où il travaille comprend trois dentistes, trois hygiénistes et trois assistantes (2e cycle), et est doté d'un micro-ordinateur depuis un an et demi.

"L'étude des problèmes et des difficultés soulevés par le traitement informatique des demandes d'indemnité, des états de compte, etc. a exigé un grand nombre d'heures. Il a fallu les résoudre en collaboration avec l'Association dentaire du Manitoba, l'Association dentaire canadienne et différents comités qui négocient avec l'Association canadienne des compagnies d'assurance-personne. Pour passer à l'informatique, il a fallu modifier les manuels de procédures et, pour ce faire, il a fallu se joindre au comité de la tierce partie et effectuer des rencontres avec le comité des questions économiques. Ensemble, nous avons résolu plusieurs problèmes communs."

En plus de s'intéresser à l'informatique, le Dr Gutkin exerce la dentisterie depuis dix ans. Il a effectué ses études à l'Université du Manitoba et obtenu son diplôme en 1973.

Attention practicing dentists: Have you ever longed for an easily implemented and relatively inexpensive way to computerize your office's accounts receivable, your billings each month, your insurance claim procedures, word processing and most important, your record-keeping methods? Of course you have! As a practicing dentist, myself, let me introduce you to such a system. Meet the painless Dental Office *Management System* called *MS80*.

This system operates on the IBM personal computer and several of the *Radio Shack* systems. I will refer to the *IBM* computer in this article for simplicity's sake, but the system runs identically on the *TRS-80* equipment. We are presently utilizing the latter in our own office at this time. A hard disk is required to run the dental system, along with a good quality, high speed, dot matrix or letter quality printer. The end-user program is written in the *COBOL* computer language by *Ryan-McFarland*. The *COBOL* program is delivered to the dental office as a machine language program on two five and one quarter inch floppy diskettes. By being delivered as a machine language program, the speed of execution is increased by 10 to 30 times in relation to similar programs delivered in the interpreted *BASIC* language.

WHAT THIS SYSTEM DID FOR US

We incorporated the *Dental Office Management System* with ease and confidence about two years ago, in our small health clinic consisting of a multiple dentist/hygienist/auxiliary environment. The computer keeps track of each dentist, each hygienist/auxiliary on an individual basis and also keeps track of the individual procedures produced by them.

The system allowed us to easily define our particular office needs. For example, we required an office size of between 10,000 and 12,000 patients, three dentists, three hygienists, several hundred procedural codes and fees and approximately 10,000 transactions a month. This requirement was easily handled, since the overall size required for these parameters is only limited by the size of the hard disk that is incorporated. Each dentist is assigned his or her own file for the maintenance of identification numbers, addresses, telephone numbers, social security/insurance numbers, etc. All these are created by the operator for their inclusion on the third party insurance claim forms.

This system is designed to accommodate both Canadian and American needs, by having the ability to produce the ADA insurance forms as well as the standard CDA forms required for third party submission. All other differences arising between the Canadian and American dental practices are also taken care of. The programer from *MICRO/SYS80* will also custom design any claim form that the user wishes, for a small fee.

Patient files are easily created by the operator, to include addresses, telephone numbers and accounting information necessary for the completion of monthly statements, records, analysis and third party insurance forms. The design of the accounting and patient screens are presented to the receptionist as an easy to read, uncluttered, form-type ledger card, that most offices are familiar with filling out, from their one-write peg board type systems.

Let us mention at this time, that the *IBM* system, whether it be the *PC* or *XT*, does require a *Winchester* type hard disk system. The size of the office is only restricted by the size of memory storage of these hard disks. The numbers range as follows: the insurance companies can be anywhere up to 100, the dentists/hygienists, up to 100, the patients range from about 10,000 upward depending on which hard disk is used and the history files and transaction records are regulated accordingly. Our own office has a 10 megabyte or 10 million byte capability, which enables us to handle the needs and requirements as mentioned above, for our small dental clinic.

Some small computer systems are operating on floppy disk drive type systems. These would require a significant number of drive units and a lot of disk swapping to accomplish a similar task to the hard disk unit. The floppy systems also operate very slowly due to slower rotation of the platter. They also begin to show signs of wear and tear with continual swapping and operating for seven to eight hours a day. I have found that the only way to fly is the *Winchester* hard disk technology. They are so reliable, so fast and so easy to back up onto diskette or tape, that the increased cost can be easily justified. The *IBM* hard disk is excellent, because of speed and reliability. The fact that the hard disk can be partitioned (i.e. split up), also allows several operating systems to be functional on one disk. This increases the amount of other types of software that become available to the dentist. Our own office uses the floppy diskette backup each day. By creating the backup of only data that changes from day to day, we protect ourselves against any possible destruction or damage to the system, because of power failure or some type of disk interruption.

Think about what you are doing now for protection of your records and accounting information? What will happen to your office if vandals or fire strikes when you are least expecting it? Disaster, probably. Most dentists are frightened to death about possible computer memory loss or system failures. They have every right to have that fear, but we are well protected; better so than the non-computerized office. There is little chance of any of our financial data going into "Static Heaven". By producing our 10-minute backups each day and taking them off the premises, we are protected against anything. If the system goes down or the office burns to the ground, I can recreate my office at any computer store, in any environment, that has access to the *IBM PC/XT* computer or compatible system. Think about that type of protection!

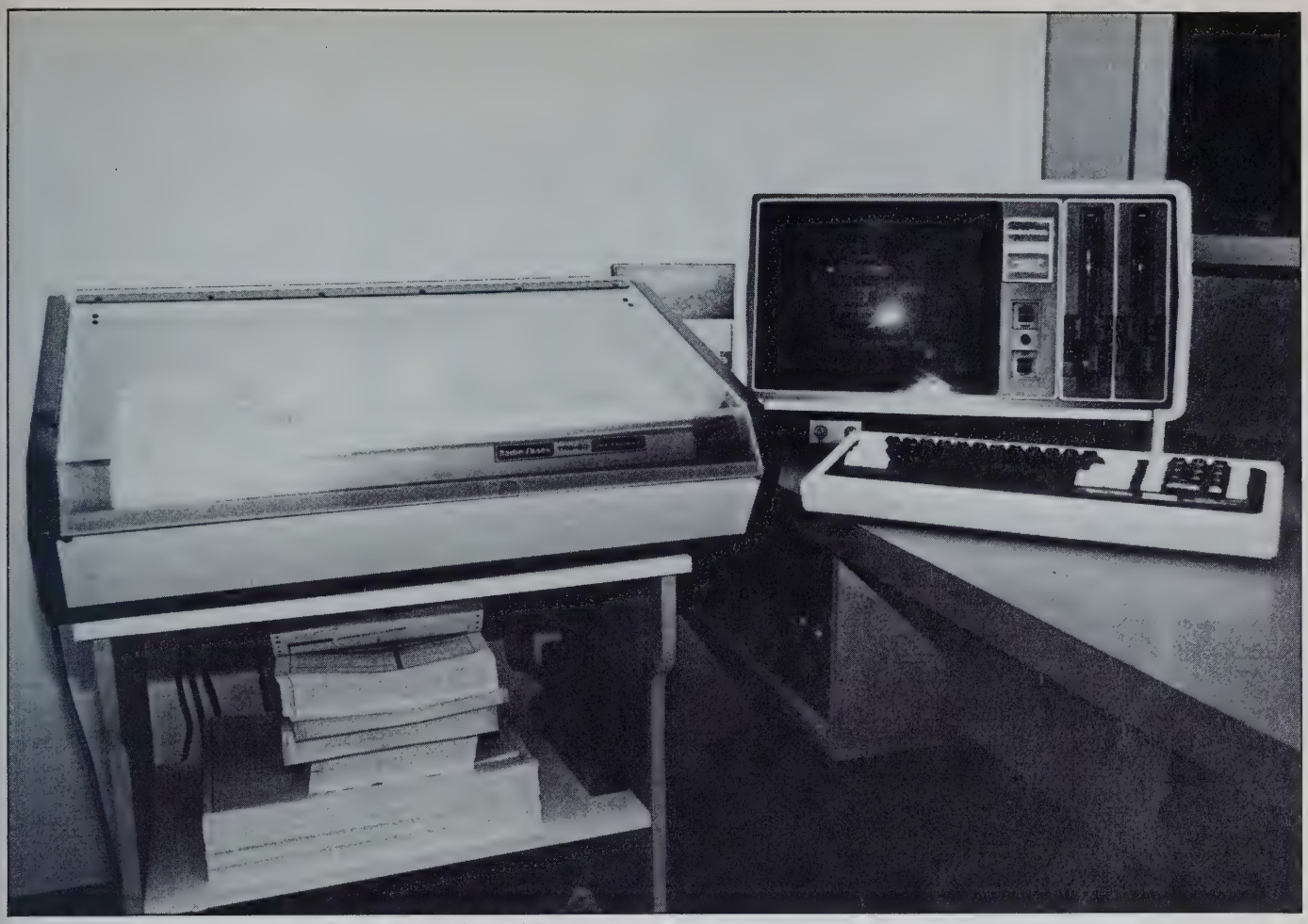
EFFICIENCY GREATLY ENHANCED

Since implementing the *Dental Office Management System*, we have seen our efficiency and operational needs greatly enhanced. Staff is kept to a minimum and tedious tasks are eliminated. The system is designed to locate patients by their names or by their account names or numbers or partial entry of names. That is one can access a SMITH, by simply entering SM or SMI, etc. Because the charges, payments, appointments and recalls for each patient are so simple to enter using the System, any non-experienced staff member can easily be trained in a short period of time to enter data. The reason for the ease of staff training lies in the fact that the manual we received with the system is spectacular. It is a tutorial type walk-through guide for the totally uninformed non-computerized dentist and his staff.

We literally knew nothing about computer data processing at first. We are all now totally confident and relaxed with the system. All patient entries are created by using that individual dentist's particular procedure codes and fees that he utilizes in his/her own office. We have placed our own provincial or state fee guide into the memory of the system for instant recall during processing.

Important note: All of these standard fee guides can be overridden during the processing.

During one processing procedure, transactions, both production and collection can be recorded, along with recalls and appointments and insurance forms which can be generated along with receipts. With one entry, accounts receivable are updated, production analysis and collection analysis is updated, insurance receivables are updated, account aging is accomplished, statements are created and stored for retrieval and many other valuable reports are stored for the dentist's use. This is done with one entry sitting. How long would it take manually? Is it possible? How many staff are required to do statements, insurance claims and



A callup provides a listing of filed information in the main computer system.

recalls? This is the efficiency that a computer provides. This is the way our receivables are kept to under 30 days with the insurance companies. Our staff can keep on top of outstanding patient accounts that are overdue or have had no payment activity.

At any time any of the information in any of the files can be added to, changed, deleted, displayed or sent to the printer for hard copy. By having these facilities at our fingertips, we can correct any mistakes that occur during entering or anytime during the day's work, without it becoming a major operation.

HOW ABOUT MANAGEMENT REPORTS?

Here is a way to reduce your accounting costs, and greatly enhance office efficiency at the same time. Sound Impossible? Not any more. For all accessible files, listings can be made in alphabetical or numerical order, on the screen or on the printer, or both. You can define in each report what data you wish to display or print. It can be a part of the report or the whole thing. We can also produce all kinds of mailing labels or lists.

This system generates a reconciliation or recap of all the daily activities, in report format. By producing this type of report each day, we are enhancing our diskette backups with a "hard copy" backup. The report is broken down into patients and then divided up as to their appropriate doctors and types of payments made. The daily function also incorporates patient charge slips for the next day's appointments or simply produces the next day's appointment list. Manually, the one write system would require an hour at the end of the day to accomplish this task. The computer does this for us in five minutes. Along with the ability to cross check procedures, the bank deposit becomes a simple task because of the breakdown of payments by type and amount.

Monthly, the reports are unbelievable! We can generate billing reports, receivable reports, production reports and collection reports for each producer in the office and for the whole office. We also have the ability to produce a practice profile to enable us to see the ups and downs of our individual practice styles. What used to take our office weeks of hard work and endless pulling of ledger cards, now takes 45 minutes. Not only is this fast, but the time occupied during the day is none. We run the statements at night when the office is closed. These statements can also be sent out by designating how long the account has been outstanding. That is to say, we can pick which accounts immediately get statements and immediately need attention. We have cut our mailings down considerably and at the same time can allow accounts that have insurance billed procedures to be reimbursed or paid by their respective insurance companies prior to sending out the statement, by delaying the billings.

Every month the system is put through a clean-up function called the purge. What this does is to eliminate all the current transactions for the present month and lump the total balances into a sum called previous balance. This function then ages and updates all the accounts and insurance company data correctly. If we did not purge these functions each month, statements would become running reports for a whole year's transactions and no accounts would be aged and updated. By purging the system, these accounts have had the transactions cleared away and no record is then available, but we must have some storage means to review patient's histories in the sense of production and payments. This is

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1368 McPHILLIPS STREET
WINNIPEG, MAN R2X 2M4
DOCTOR'S NO 2361
TELEPHONE 204-633-5610
SOCIAL INSURANCE NO 212 545 849

PATIENT: JUDY DILLON
1245-115 1rst STREET N.W.
WINNIPEG, MAN. R3N 150
00008 TEL. 215-445-8720

DATE OF SERVICE DAY	MO	YR	NO. OF TOOTH	PROCEDURE CODE	TOOTH SURFACES	LABORATORY CHARGE	DENTIST'S FEE	TOTAL CHARGE
02	02	84	24	21212	MO		29.50	29.50
02	02	84	25	21213	MOD		36.50	36.50
02	02	84	12	23113	MI		59.40	59.40
02	02	84	46	27210	FULL		232.00	232.00
02	02	84	46	29554	FULL	145.28		145.28
02	02	84		11300			25.50	25.50
02	02	84		12200			7.00	7.00

THIS IS AN ACCURATE STATEMENT OF SERVICES PERFORMED AND FEES CHARGED E & O E
TOTAL SUBMITTED FEE → 535.18
DENTIST'S SIGNATURE 02 02 84 (DAY MONTH YEAR)
FOR DENTIST'S USE ONLY FOR ADDITIONAL INFORMATION RE DIAGNOSIS PROCEDURES OR COMPLICATIONS AND SPECIAL CONSIDERATIONS

I UNDERSTAND THAT THE FEES LISTED IN THIS CLAIM MAY NOT BE COVERED BY OR MAY EXCEED MY POLICY BENEFITS. I UNDERSTAND THAT I AM FINANCIALLY RESPONSIBLE TO MY DENTIST FOR THE ENTIRE COST OF THE TREATMENT. I AUTHORIZE RELEASE OF THE INFORMATION CONTAINED IN THIS CLAIM FORM TO MY INSURING COMPANY OR ITS AGENTS
SIGNATURE OF PATIENT (OR PARENT GUARDIAN)

I HEREBY ASSIGN BENEFITS PAYABLE FROM THIS CLAIM TO THE ABOVE NAMED DENTIST AND AUTHORIZE PAYMENT DIRECTLY TO HIM
SIGNATURE OF SUBSCRIBER

FOR PLAN ADMINISTRATOR USE ONLY

%	%	%	

PART 2 INSURED/SUBSCRIBER COMPLETE THIS PART BEFORE TAKING THE FORM TO YOUR DENTIST'S OFFICE

1 PATIENT RELATIONSHIP TO INSURED _____ DATE OF BIRTH _____
IF CHILD AGE 21 OR OVER INDICATE ☐ STUDENT ☐ HANDICAPPED
2 ARE ANY DENTAL BENEFITS OR SERVICES PROVIDED UNDER ANY OTHER GROUP INSURANCE OR DENTAL PLAN? ☐ NO ☐ YES POLICY NUMBER _____
NAME OF INSURING AGENCY _____
3 IS ANY TREATMENT REQUIRED AS A RESULT OF AN ACCIDENT? ☐ NO ☐ YES
4 IS ANY TREATMENT FOR ORTHODONTIC PURPOSES? ☐ NO ☐ YES
5 IF DENTURE CROWN OR BRIDGE IS THIS INITIAL PLACEMENT? ☐ NO ☐ YES
GIVE DATE OF PRIOR PLACEMENT AND REASON FOR PLACEMENT
6 I AUTHORIZE THE RELEASE OF ANY INFORMATION OR RECORDS REQUESTED IN RESPECT OF THIS CLAIM TO THE INSURER OR ITS AGENT AND CERTIFY THAT THE INFORMATION GIVEN IS TRUE CORRECT AND COMPLETE TO THE BEST OF MY KNOWLEDGE
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done during the purging by placing those transactions into a History file to be stored for a designated time period. This time period depends upon two things. One is the dentist and how long the dentist wishes to store this information for reference and the most important, is the size of the storage media used, i.e. the size of the hard disk. We store our history records of this nature for 13 months. We then have the ability to produce hard copy of the collection history for the year or part thereof.

The system has also been designed to incorporate the specialists in the profession, i.e. the orthodontist who has rather specialized needs in accounting. Orthodontists do not bill patients for one appointment at a time. A single procedure is usually carried out over one to two years and the charges and payments, likewise. Most other systems do not have this facility to properly assign charges and payments in an organized instalment fashion. We can generate an instalment type billing, so that the patient is charged a predetermined amount each month and statements and insurance forms are spaced and calculated accordingly. Without this type of option, a regular dental system cannot function correctly in these situations. Also, the practitioner is not handling his accounts in terms of taxable income, correctly. The instalment system also ages the amounts of the instalments rather than the whole account total. The patient receives an accurately itemized and aged instalment bill.

THE BEST FEATURE OF THIS SYSTEM

The biggest plus of the whole system is in its ease of implementation. Our experience was probably a typical situation. With no prior computer knowledge, with manual in hand, and computer turned on, we began. We were able to obtain from the software firm, a complete demonstration system that enabled us to create a mock office situation prior to computerizing our office with one specific type of software system. What we did was to take the software to a computer store and learn step by step if the system was what we wanted and if it was easy enough to implement. Without any outside help from the stores or programer, we were able to easily understand the workings of such an office system and decide on its feasibility in our office.

Letting go of old ways and starting a fresh is always a difficult task. Once we had decided on this system, we had to start the transition. For about 60 days, we ran both the computerized system and the manual system in parallel. This allowed staff members to relax and become familiar with the system without panic. By doing this type of transition, we proved to ourselves the accuracy, efficiency and reliability of a computerized office system. Nobody initially believes that a computer is right. We found out entirely the opposite. The tedium and monotony of the repetitious tasks were eliminated and the staff learned to "painlessly" accept computerization and leave behind outdated ways.

It has now been almost two years since first completely letting our "manual" ways go. We are certainly happy with the results and with the future of our system. We now have an end users group in the U.S.A. and Canada and *MICRO/SYS80* publish a communications and fact-finding newsletter to the end users every month or so. The system programers are always looking for ways to upgrade and improve the system. Most upgrades and enhancements have been done at little or no additional charge to us. Most customized demands were accomplished rapidly and without "bugs". Even though all support is by phone or letter, we have had no problems with it.

We had reviewed many such systems before turning our entire attention to this one. The cost of implementation is extremely reasonable, both in terms of software and hardware requirements. We are assured of quality hardware support, enhancements and improvements and large amounts of non-dental software being available. Maintenance costs are minimal and breakdowns are few.

The mention of commercial products in this article should not be construed as support, approval or recommendation to use them. Conversely, the omission of products designed for similar purposes should not be interpreted as disapproval or prejudice.

THE FOREIGN LEGION?

Jean Cives

"Jean Cives", a past contributor to the Journal, began making a comeback in these pages in the January 1984 issue. A second Vignette, on the subject of dentists practicing in remote areas, is presented here for the anticipated enjoyment of our readers.

Quite a few dentists I have known have been strangers – not your usual type – members of the "Legion Étrangère", as my friends in the Gallic world would call. Consider, for example, the fellow about three years behind me in dental school – whose career I followed with interest. Entrapped within that dental body was a non-conformist crying for freedom. Did he care about dentures for the elderly, preventive dentistry for the young – yes, he did, but in his own way. He was "fantastic" with old ladies and small children, but a disaster with the established dentists and professors. His name mentioned among the Faculty, I learned later, made professors pale, technicians tremble, and agitated assistants.

His downfall was a master-stroke of non-conformity. He had a healthy distaste for law and order, as one could expect. Did he just assault the Gendarmes? Did he write revolutionary slogans on the Dean's office door? – No, he made statements, as they say in the North American circles of decent revolutionary folk. He spent one Saturday night pelting patrolling policemen with mushrooms from his second-floor apartment. The Judge was mystified, but felt sure this was a criminal act rather than a civil disturbance – one can hardly riot by oneself, and a mushroom is hardly a vegetable of protest, nor is it an offensive weapon. Dilemma in judicial circles. Solution – a conviction, but no punishment. Confusion on campus as a conviction meant automatic dismissal from the hallowed halls. However, justice was tempered with mercy. A mushroom throwing student was held to be irresponsible. With a bomb, he would have been sent to Siberia, with mushrooms – merely sent away for six months.

"Did he learn his lesson?", as my Aunt was wont to say. Yes, he did; he returned next session, was an exemplary student, graduated without problem, left the country, and bought a junk-yard in foreign parts. He became a very successful used-anything dealer, buying grannie's old footstool for 5 dinars and selling it for 500. Incidentally, his office was two stories. Upstairs he had a dental office and could do a quick amalgam or denture – whatever was your fancy, and all for cash.

Then there was the dentist whose brother became a minister in the provincial government, whose conversation always began "My brother, the Minister . . . ." so that we all knew him as "My brother, the Minister". Then there was the mildly larcenous dental student who on graduation became so involved in fundamentalism that he held prayer meetings at lunch-time for all his staff and patients.

Then there was my colleague, who hired through the social welfare office our friendly local motorcycle gang to paint his office. Was he astonished at the effects of leather-jacket, gum-chewing painters, who invaded his office at sporadic intervals to slosh a bit of paint around. I must admit the local middle-class matrons were absolutely fascinated by their fundamental (in another sense) remarks about dentistry and painting. My colleagues' dental enthusiasm was completely unable to persuade them to floss their teeth.

A Mountie once told me of the dentist in the small faraway village, not on the Prairie, and not really in the mountains but as far from anywhere dentists might congregate for a monthly meeting or two. This legionnaire was a lonely man, but beloved by all the locals because he was, at that time the only dentist within a day's march. During the week, he laboured away among the amalgam mines in the locals' teeth, and quite often felling old ring-barked mossy molars with forceps. As I will repeat, beloved by all except the Mounties and dog-owners. As many a legionnaire did, he would take a little drink or two at the end of the day's duty on the dental ramparts. As many a legionnaire will tell you, the war-weary, the lonely will oft times take a little more than perhaps you or I – the effects of stress at a lonely post, you know. When the juice (locally made, I suspect) got its way with him, he turned from a meek gentle man into a mission-oriented zealot. Inside him boiled a hatred for dogs, and thus he would gently raise a window, put out his small-bore rifle, and try to shoot passing dogs. This caused all sorts of mayhem. Lady dog owners in panic called the Mounties, the lads in the local bars pulled shutters over the windows and toasted "Our local tooth-puller and dog-killer". Could the Mounties arrest him for discharging a firearm in a public place or whatever the charge was? No, because all that would happen is that the town and region would be without a dentist. They would go and disarm him yet again. Peace for all dogs would then reign, until either the hunting season started, or the first Mountie needed a check-up, whichever came sooner. We have, I think more than our proportionate share of Foreign Legionnaires struggling in the desert of dental practice and society against the unbelievers. There was that dentist who started writing almost libellous vignettes about dentistry in the local dental journal . . . Sidibel-Abbes – where are you? Beau Jeste, I am here.

(Ref. RD/RHR/PAPER;Profession.8-.10)

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BULLETIN

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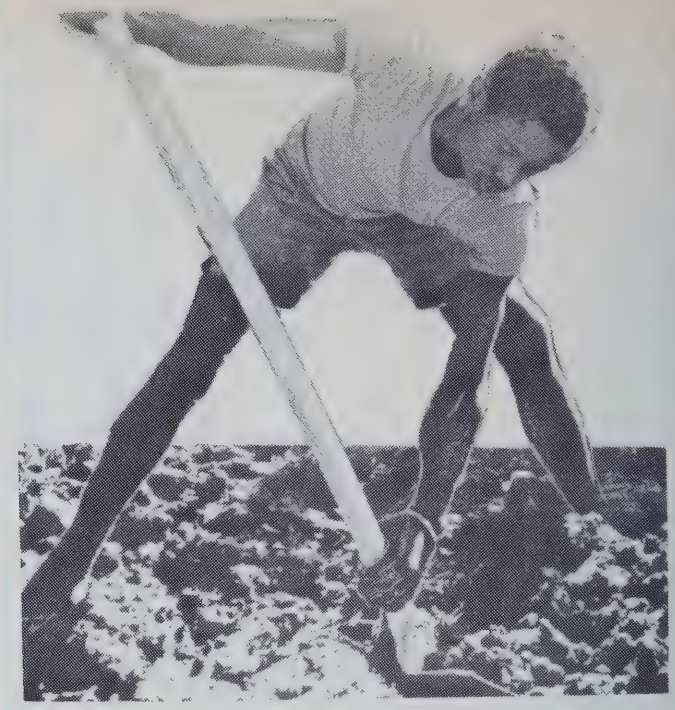

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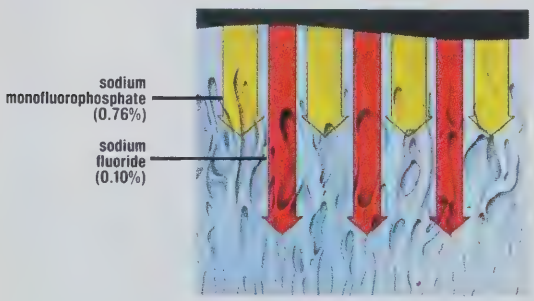
How Colgate's two fluoride formula achieves more complete remineralization resulting in nearly double the cavity protection of a single fluoride formula*.

A major role of fluoride in cavity prevention is to accelerate the process by which demineralized enamel is rebuilt.[1-4] This reverses white spot lesions which would otherwise become cavities.

Today's Colgate is the first toothpaste with two fluorides—sodium monofluorophosphate at 0.76% and sodium fluoride at 0.10%. Their differing molecular structures mean that these fluorides may work in different ways in tooth enamel. The result at these concentrations, is more complete remineralization of white spot lesions than either can achieve alone.

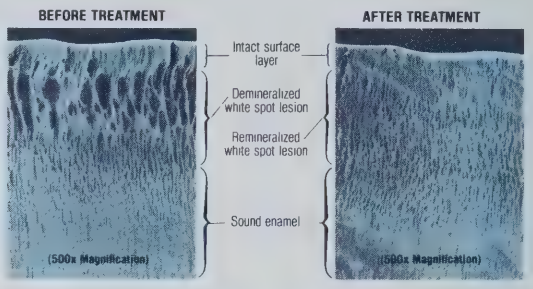
Why these two fluorides remineralize more completely.

It has been postulated that fluorides reach white spot lesions by penetrating enamel through the interprismatic spaces. Sodium monofluorophosphate, being a larger molecule, reacts with enamel primarily at the surface of a white spot lesion. Sodium fluoride, a smaller molecule, penetrates deeper into the lesion.



Working at different levels, the two fluorides may complement each other, enhancing remineralization over a greater area of the lesion than a single fluoride* alone.

This complementary action means more fluoride is available to enhance remineralization over a greater depth of the lesion than is provided by either fluoride alone.[5,6]



This more complete remineralization has been demonstrated in laboratory studies,[7] and can be seen in the photomicrographs above.

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Colgate with this two fluoride concept was tested in a three year clinical study.[8] The results—Colgate's two fluoride formula provided 27.0% reduction in new caries versus 13.8% for the single fluoride positive control* (DMFT).

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*Sodium monofluorophosphate (0.76%)

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DENTAL SEALANTS IN THE PREVENTION OF TOOTH DECAY

The National Institutes of Health, in Bethesda, Maryland, recently held a Consensus Development Conference on dental sealants. A statement of the introduction to that Conference and its conclusions is reprinted here for the benefit of our readership.

The statement is reprinted with permission. The conference was sponsored jointly by the National Institute of Dental Research and the Office of Medical Applications of Research.

INTRODUCTION

The chewing surfaces of children's teeth are the most susceptible to decay and least benefited by fluorides. In recent years scientists have developed plastic films that are applied to these chewing surfaces to seal the pits and grooves where food and bacteria can be trapped. These dental sealants offer a new approach to the prevention of dental caries.

The National Institutes of Health convened a Consensus Development Conference on December 5-7, 1983, to evaluate the effectiveness, safety, and implementation of the sealant procedure. After hearing a day and a half of presentations by experts of data on dental sealants, a Consensus Panel of biomedical investigators, practicing dentists, academicians, a dental hygienist, a statistician, and representatives from public interest groups considered the evidence and agreed on answers to the following questions:

1. With the current widespread use of fluorides and the generalized decrease in caries experience among children, is there a need for sealants?
2. How effective are sealants?
3. Are there risks associated with the use of sealants?
4. What are the indications for using sealants in individual and community-based caries preventive programs?
5. What are the clinical procedures involved in successful sealant application, and what training and education are required?
6. What factors have influenced and should influence the adoption and utilization of sealants for caries prevention?
7. What is the current status of sealant research and what should be the research priorities for sealants and their implementation?

PANEL'S CONCLUSIONS

The placement of sealants is a highly effective means of preventing pit and fissure caries. It is safe. It is currently underused in both private and public dental health care delivery systems. The reasons for such underuse are complex, but intensive efforts should be undertaken to increase sealant use. Expanding the use of sealants would substantially reduce the occurrence of dental caries in the population beyond that already achieved by fluorides and other preventive measures. Because dental caries is still a disease common to most young people in the United States and in other countries of the world, such reductions would substantially improve the health of the public and reduce the expenditures for treatment of dental disease.

Practitioners, dental health agency directors, and dental educators are urged to incorporate the appropriate use of sealants into their practices and programs.

It must be emphasized that the substantial reductions in dental decay that have occurred in the young population in the United States are due, for the most part, to the use of systemic and topical fluorides. These programs should be continued and expanded if we are to maintain and continue the trend in caries reduction. Indeed, the control of smooth surface caries that is provided by fluorides is of critical importance to the additional effectiveness of sealants.

1. With the current widespread use of fluorides and the generalized decrease in caries experience among children, is there a need for sealants?

The panel believes that the answer to this question is yes. Recent studies have indicated that the prevalence of coronal caries in children and adolescents is declining, due mainly to the beneficial effect of water fluoridation and other methods of fluoride delivery. Nevertheless, by age 16, American children have an average of nearly 10 decayed, missing (extracted), or filled tooth surfaces. In other industrialized countries, caries scores have also declined but are still substantial. In a few industrialized countries

and many of the developing nations, caries scores are still increasing. The vast majority of young people in the world have dental decay. Prevention of the disease is a much better objective than treatment. Worse yet is nontreatment – with the pain and impaired function that follow. Thus, the need for additional or improved preventive methods is still compelling.

It is of particular interest that dental caries is today largely a disease of pits and fissures of the teeth as opposed to lesions in smooth tooth surfaces. The National Dental Caries Prevalence Survey (1979-1980) revealed that only 16 percent of the caries experience of 5- to 17-year-old children occurred in approximal (smooth) surfaces, while 84 percent involved surfaces with pits and fissures. Systemic and topical fluorides have a less profound caries preventive effect on the pit and fissure tooth surfaces than on smooth surfaces. The major remaining need in the young population is to reduce or eliminate the carious process occurring in pits and fissures. These areas include primarily the occlusal or chewing surfaces of primary and permanent molars and of premolars.

Certain population groups have an especially urgent need for preventive measures, including sealants. These groups include immigrant populations, people who are institutionalized, disabled people, those with a low income, and others.

2. How effective are sealants?

Sealants are highly effective in preventing pit and fissure caries. The effectiveness of dental sealants in the prevention of tooth decay has been demonstrated in a variety of research findings covering a span of 16 years. In the last several years, investigators in several countries have repeatedly demonstrated that caries protection is 100% in pits and fissures that remain completely sealed. Complete retention rates after one year are 85% or better and after five years are at least 50%. These trials have shown that a close correlation exists between retention of sealants and their effectiveness, regardless of how the latter is defined and measured.

Acid-etch resin sealants are classified into three types, based on the method by which they are cured (hardened): ultraviolet light-cured, chemically or self-cured, and visible light-cured. Research studies have demonstrated that self-cured sealants are somewhat more effective than ultraviolet light-cured sealants. More research is required to establish the relative long-term effectiveness of the visible light-cured sealants, although retention rates after two years look favorable. Sealants have been demonstrated to be effective in communities both with and without fluoridated water.

Effectiveness is further increased if lost or partially lost sealants are replaced or repaired at visits subsequent to initial placement. The typical recall system in a private dental practice makes such replacement and repair convenient. Although recall is more difficult in community-based programs, it would enhance effectiveness in these settings as well.

The effectiveness of sealants appears to be equal whether applied by dentists, dental hygienists, or dental assistants, provided that they have received appropriate training. The use of hygienist/assistant teams has proven to be particularly effective in public health settings.

While the subject of the conference was the prevention of dental caries, it is suggested that sealants may also be used to arrest the progress of incipient or small pit and fissure lesions. Further exploration of this approach through careful clinical studies is to be encouraged.

3. Are these risks associated with the use of sealants?

The risks associated with the use of pit and fissure sealants are minimal, and sealants are safe when properly placed using state-of-the-art materials and procedures.

In considering the risks associated with the use of sealants, the panel evaluated both the possible systemic and local effects of the procedure. No systemic toxicity from the clinical use of sealants has been reported. The sealants currently classified as acceptable or provisionally acceptable by the Council on Dental Materials, Instruments, and Equipment of the American Dental Association contain no known toxic materials or carcinogenic agents. Sealants have also received favorable evaluation by the Food and Drug Administration. The chemical compositions of resin formulations used for sealing developmental pits and fissures are similar to, or the same as, monomeric resins that have been used for other dental purposes for many years.

Some concern has been expressed about the local tissue effects from the phosphoric acid solution used to prepare the enamel for bonding of the sealant resins. There is no evidence to indicate that this has been a significant problem when the etchant is used properly.

Questions regarding the possibility of the progression of dental caries beneath properly applied sealants have been answered by clinical studies. The evidence is overwhelming that the vitality of the dental pulp is not endangered by incidental placing of sealants over small pit and fissure lesions. In fact, minor carious lesions covered by sealants seem to become inactive, and the process of tooth decay is apparently arrested by the sealant. Investigators have reported negative or reduced bacterial cultures following several years of sealing. No studies have identified significant caries progression beneath an intact sealant. Sealants apparently seal off residual bacteria from their principal nutrient supply, thus preventing the accumulation of acid in cariogenic concentrations.

The fear that the enamel will become more susceptible to caries if the sealant is lost seems unfounded. Studies have shown that a tooth which has been treated and then lost its sealant is no more susceptible to caries than a tooth that has not been treated.

Concern has been expressed that the placement of sealants in excessive thickness could cause occlusal disharmonies. However, there are no reports of such problems in the extensive clinical trials that have been conducted.

In addition to the risk to the patient, the panel considered possible risks to dental professionals, especially those placing sealants on a regular basis. No evidence was reported for mutagenic or other systemic risks to such personnel. The panel recommends that protective glasses be worn by operators when using either the ultraviolet or visible light-cured materials.

There are social and economic risks in the widespread adoption of any new technology. For example, if a society emphasizes one technology, it runs the risk of deemphasizing others or of not having resources available to support them. These issues of social resource allocation risks or the relative importance of dental sealants and other social needs are beyond the scope of this panel.

4. What are the indications for using sealants in individual and community-based caries preventive programs?

INDIVIDUAL PROGRAMS

Patients or their guardians should be made aware of the availability of sealants and, except where sealing is clearly inappropriate, given the opportunity to have sealants placed. Those individuals who can benefit from such treatment are:

a. Children with newly erupted teeth with pits and fissures.
b. Children whose lifestyle, developmental or behavioral patterns, or lack of fluoride exposure put them at high risk for dental caries.
c. Children with teeth that have pits and fissures that are anatomically susceptible to caries.
d. Other persons who desire sealant application and for whom sealant therapy is technically feasible.

In addition, evidence has been presented that children may benefit from having small carious lesions sealed, but further studies should be conducted to define the utility of this approach. Informed dentists and guardians should have the opportunity to make such a choice.

COMMUNITY-BASED PROGRAMS

Ideally, children should have access to sealant application on the same basis whether they are in individual or in community-based programs. However, when resources do not permit this, priorities should be established. Sealant programs should be implemented in communities where the preventive effect will be optimal, with consideration for prevalence of approximal caries, fluoridation status, and unique features of the population.

Within these communities, priorities may be established on the basis of eruptive patterns, control of smooth surface caries through the use of fluorides, known population groups with special needs (for example, institutionalized persons or ethnic and cultural groups with demonstrated high caries rates) and those who do not have access to restorative dental care.

Sealants should be a part of state Medicaid funding programs where dental services for children are provided. Recommended priorities for sealant application among the Medicaid population are as follows:

Priority 1: Permanent first molars for children ages 6 through 8 and permanent second molars for children ages 11 through 13.

Priority 2: Premolars in high-risk children and primary molars.

The various agencies responsible for other government-funded programs should develop priorities to ensure the most effective use of sealants for their service beneficiaries.

MINORITY OPINION — ROBERT M. VEATCH, Ph D

The establishing of priorities in community-based programs can be based on either the principle of maximizing the good in the community per unit of investment, or the principle of justice that requires treating all citizens equally, regardless of whether that will maximize efficiency. The majority has opted for the utilitarian strategy. Critics of utilitarianism have recognized that its principles can compromise the just claims and rights of some members of the community.

I accept that priorities can be established ethically but do not believe it is the place of this panel to propose ways in which the needs, welfare, and rights of patients should be compromised. If priorities are established, they must be based on the just claims of individuals regardless of whether honoring their rights will maximize community welfare. I accept priorities that are based on age or eruption status. Since all members of the community pass through an age progression and experience eruption of teeth, priorities can be established on this basis in a nondiscriminatory way. Priorities based on sex, race, ethnic group, socioeconomic status, the socioeconomic status of a school, fluoridation status of the patient's community, or the community approximal caries rate should be rejected. Giving priority on the basis of any of these criteria discriminates against those children who, through no fault of their own, are in social groups that will produce less efficient investment payoffs. They will be discriminated against even if in their own cases sealant treatment predictably will produce great benefit. For example, under the utilitarian strategy of giving priority to communities with fluoridation, a child in a nonfluoridated community with low approximal caries whose parents have obtained fluoride treatment for him or her (through professional or self-application) would be excluded from a community-based sealant program. A child in a fluoridated community, who is in all morally relevant respects identical, would receive sealant treatment benefits.

In my opinion, dental sealants for at least some teeth are an essential part of an adequate minimum of health care and are thus a basic right of all citizens.

5. What are the clinical procedures involved in successful sealant application, and what training and education are required?

The procedure of properly applying a sealant is conceptually uncomplicated. Under actual clinical conditions, however, it may be simple or difficult to execute correctly. Clinical procedures for successful sealant application are as follows:

1. The tooth must be isolated so that adequate access is established to observe the field and to reach tooth surfaces with the appropriate instruments. This isolation must also ensure that saliva contamination of the surfaces to be sealed can be prevented at critical points in the procedure.
2. The surfaces should be cleaned with a prophylaxis brush or rubber cup and a cleansing agent that contains no oil or other substance that cannot be completely and quickly washed from the surfaces with water. The cleansing agent should be carefully washed from the surfaces using a water syringe and aspiration or high-speed evacuation.
3. When the teeth are effectively isolated from saliva contamination, the surfaces are dried and etched by application of a 30- to 50-percent phosphoric acid solution for one minute. The solution is gently agitated during the application. It should cover all of the areas to be sealed.
4. The acid should be washed away with water and aspiration or high-speed evacuation. The surfaces are carefully dried and inspected to ensure that the frosty-appearing etch covers the area intended. The absolute avoidance of contamination with saliva or air-line moisture or oil is critical from the time of acid removal and drying until the sealant is cured. If contamination is suspected, re-etching of the surface for 20 seconds is indicated.
5. The sealant should be applied according to the manufacturers' instructions. Care should be taken to avoid entrapment of air bubbles, to extend the sealant into all the grooves and pits, and to avoid extension of the sealant onto unetched smooth surfaces or soft tissues. The sealant must remain uncontaminated and undisturbed until it is cured to hardness.
6. The sealant should be examined to ensure that underextension, overextension, undercuring, or voids have not occurred. A reasonable attempt should be made to remove the sealant to determine if adequate bond strength has been established.

Fluoride should not be applied to the enamel surface immediately before a sealant procedure is initiated. Fluoride may be applied immediately after sealant application.

The most common reason for sealant failure is contamination of the etched surface with saliva or air-line moisture or oil. Adequate isolation from saliva for the time required is usually the most difficult step. Inability to do so is the most frequent reason why sealants cannot be placed on surfaces where they would be of benefit.

Only sealant products classified as acceptable or provisionally acceptable by the Council on Dental Materials, Instruments, and Equipment of the American Dental Association and thus having documented clinical effectiveness should be used.

As in any clinical method, exacting execution of the method and use of proven materials is required to obtain the desired result.

Research has proved that the efficacy of sealants is based on the retention of the sealant. Retention of sealants is definitely technique-related. Anyone being trained — whether dentist, hygienist, assistant, student, or experienced practitioner — should have the same understanding and competence in the technique of application. To accomplish this, the panel recommends that all training programs consists of three components:

1. A didactic program consisting of lectures

and readings on the histologic and microbiologic implications of sealants, the rationale and indications for their use, their clinical usefulness in individual and community-based caries preventive programs, and the technique of application.

2. A laboratory or preclinical program to familiarize the trainee with the materials and methods.

3. A clinical program involving actual application of sealants to patients' teeth. During this time it is important to have the steps in the procedure as well as the end product monitored by experienced personnel.

Sealant technique should be taught and used as one component of a total preventive program including systemic and topical fluorides, oral hygiene instruction, dietary counselling, and periodic examinations.

The amount of time to be devoted to the foregoing education program will depend on the previous knowledge and clinical experience of the trainee. Skilled practitioners with experience in patient management and related clinical techniques may require as few as one or two patients to demonstrate adequate proficiency, whereas three to five days of clinical experience should be expected for students or less experienced professionals.

6. What factors have influenced and should influence the adoption and utilization of sealants for caries prevention?

Various factors have been reported as contributing to the underutilization of sealants by dental professionals. Some of the concerns which have apparently discouraged adoption and use of sealants are related to:

a. Perceived lack of data demonstrating efficacy.
b. Possibility of sealing in decay with subsequent progression of the lesion.
c. Lack of retention of sealants.
d. Unfamiliarity with technique.
e. Difficulty in explaining the rationale and procedure to patients and parents.
f. Lack of third-party payment.
g. Belief that amalgam restorations are better and more economical.
h. Insufficient instruction in curricula for dental personnel.
i. Restrictive state dental practice acts.
j. Lack of availability of public information about the method and its benefits, and a resulting lack of public awareness.

In reviewing information on each of the above factors, the panel noted:

a. An extensive body of knowledge has firmly established the scientific basis for the use of sealants. With the changing pattern of caries in the direction of occlusal caries, sealants are specifically targeted to prevent most of the remaining decay in the young population.
b. With respect to sealing in decay, there is no evidence that placing a sealant over small lesions has resulted in progression of decay. To the contrary, it appears to have prevented further progress of such lesions.
c. Well-controlled clinical studies have demonstrated the retention of sealants for five or more years and these data clearly support the caries preventive effect. Current materials and methods are remarkably improved over first-generation sealants.
d. The method is standardized and widely published in the scientific literature.
e. Better printed and audio-visual material should be made readily available to the profession to assist in explaining to the public the method, rationale, effectiveness, and safety of using sealants to prevent caries.
f. An effort should be undertaken to prepare guidelines for the use of sealants that are acceptable to third-party payers. The reimbursement situation for sealants is analogous to the situation with topical fluoride treatment 15 years ago.
g. Recent studies have shown that a properly placed sealant will last for a period of time approximating that of a typical amalgam restoration and the cost is usually less. The noninvasive nature of sealant application is exceedingly attractive. No significant amount of tooth structure is removed and application of the sealant is usually not uncomfortable.
h. It has been reported that recent dental graduates will use sealants in practice when they have been previously exposed to enthusiastic, comprehensive instruction by their faculty.
i. Trends to broaden state dental practice acts allowing dental auxiliaries to place sealants are positive steps. These trends should continue so that dental auxiliaries can place sealants in all states. Personnel costs can be reduced in this manner.
j. A vigorous effort should be undertaken to inform all sectors of the public about sealants, their effectiveness and safety, and the rationale for their use. Educational materials should be developed and disseminated by government agencies and professional organizations.
k. The inclusion of sealants in government-funded programs would serve as an example and be influential in increasing the adoption and use of this technique in private practice and other community-based settings.

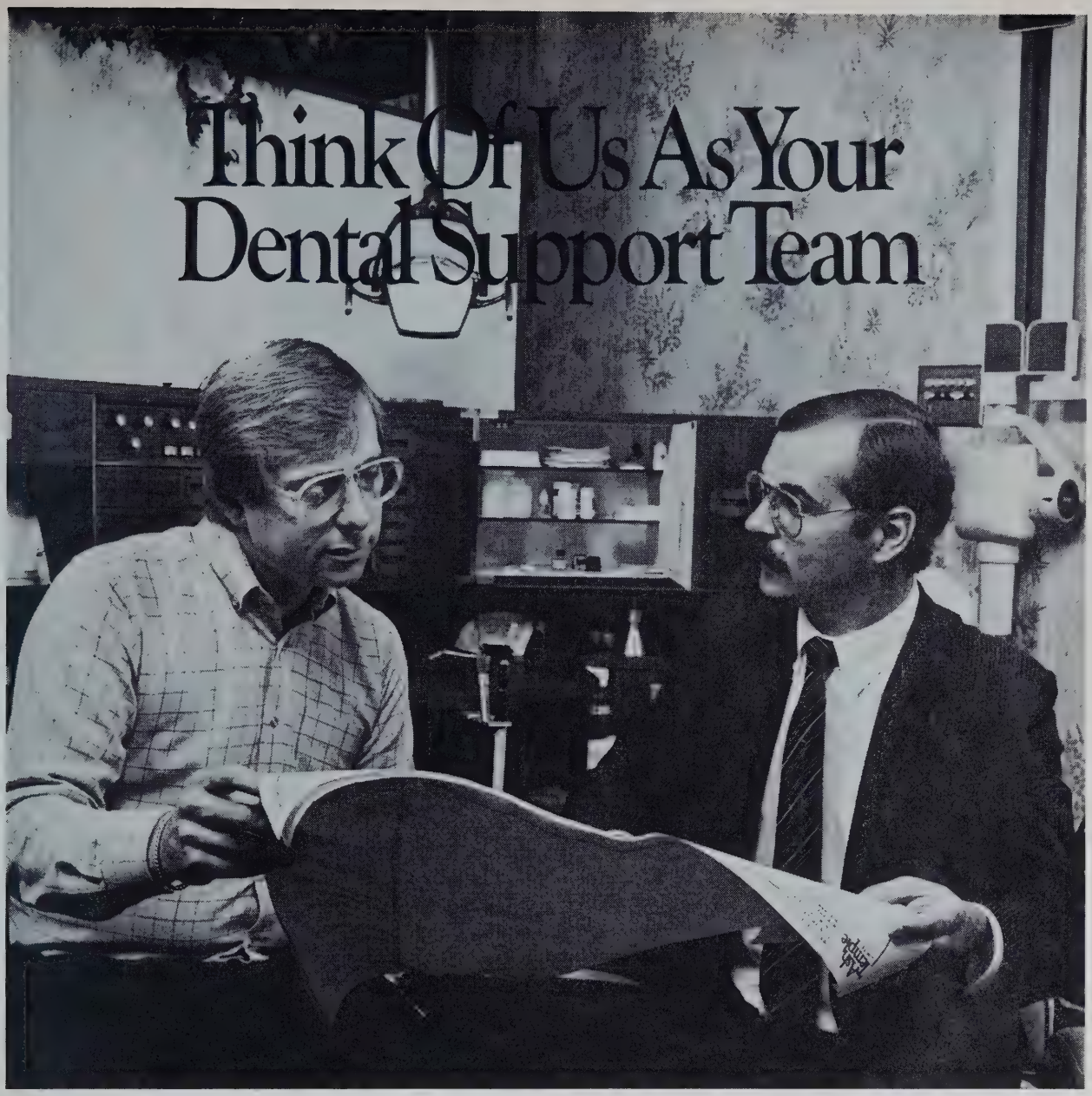
The dental profession has been a leader in advancing research on, and advocating primary efforts in, the prevention of dental caries. A prime example is the success of fluoridation programs. The preventive, noninvasive features of sealant application are important advantages. Application is usually easy and comfortable for the patient. In an era when the public has an ever-increasing consciousness about the prevention of disease, it behooves the dental profession to explain the successs of sealants to the public and thereby promote yet another advance that will further reduce one of the chronic diseases of our society.

7. What is the current status of sealant research and what should be the research priorities for sealants and their implementation?

Basic and clinical research supports the extensive use of sealants. The details of the acid-etch technique and the subsequent bonding of sealants to the etched enamel are well understood. The basic chemistry of the sealant resins and the reactions by which they are cured are defined. Clinical investigations have shown repeatedly that sealants are a highly effective means of preventing pit and fissure caries. Studies have established the safety of the method with a high degree of confidence.

Continuing research on sealants should be directed to the following objectives:

- Improvement of current sealant technology.
  - Improvement of acid-etch methods.
  - Improvement of the properties of the sealant resins, possibly including more hydrophilic resins.
  - Improvement of methods of preventing saliva and other contamination of the etched surface.
  - Development of high-quality fluoride-releasing resins.
  - Studies on newer materials, including toxicology, tissue compatibility, and mutagenicity.
- More complete understanding of the effect of sealants on cariogenic bacteria in carious lesions.
- Obtaining more useful data on the cost-effectiveness of using sealants in community programs under a variety of circumstances and employing various strategies with respect to personnel and target populations.
- Development of new technologies for bonding sealants to enamel that would not require acid etching of the enamel or the strict avoidance of enamel surface contamination prior to application of the sealant.
- Further understanding of the reason for sealant underutilization.
- Development of low-cost screening methods to identify children at high risk of getting pit and fissure caries.



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POSSIBILITIES FOR TREATING PERIODONTAL DISEASE AS SPECIFIC ANAEROBIC INFECTIONS

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INTRODUCTION

Periodontal disease, despite its common occurrence in adult populations[1] has been a neglected entity in clinical dentistry. This is perhaps best demonstrated by the income generated for periodontal treatment by the dentist in his private practice. As recently as 1977 dentists in the United States reported that less than one per cent of their fees was for the deliverance of periodontal therapy[2]. This reflects a rather serious mismatch between the adult population's main dental needs and the dentist's apparent inability to deliver treatment for such.

This neglect of periodontal disease by the dental profession has some basis in fact. The overwhelming need of the public for treatment of dental caries has dominated clinical practice to the exclusion of most other forms of dental therapy. This need however is abating in North America, Scandinavia and the British Commonwealth countries[3] to the extent that currently it is perceived that there may be a surplus of dentists in some of these countries. This surplus, however, is only relative to restorative dentistry, and not necessarily to the total dental needs of the population. Thus, many dentists, with surplus time, will need to reorganize their skills so as to address the periodontal problems in their patients.

A second reason why periodontal disease has been neglected relates to the scientific and clinical insights into periodontal disease that the dentist received in dental school. Most dentists have been taught that dental plaque is the etiologic agent of both dental caries and periodontal disease. Accordingly, the debridement of plaque via oral hygiene procedures, which is routinely recommended for caries control, is synonymous with the treatment of periodontal disease. Thus, when a patient presents with moderate to deep pockets, many dentists will intensify oral hygiene procedures. There is no evidence that oral hygiene procedures per se *can resolve periodontitis (***see Table 3***). The more definitive treatments such as meticulous root surface debridement with or without gingival surgery, may either be not cost effective (debridement), or beyond the training of the dentist (surgery). Faced with these problems, the dentist usually refers the periodontal patient to the specialists.*

While the above scenario is somewhat simplistic, it does describe in broad strokes the clinical situation that exists in some parts of North America and Europe today. Clearly there is a need to match the evolving underutilization of the dentist's time with the periodontal treatment needs of the patient. This can be done by putting the treatment of periodontal disease on a modern biological foundation. Modern, because the existing fabric of science upon which most of our clinical procedures are based, was enunciated by Black, "extension for prevention" and Miller "plaque debridement from retention sites" at the turn of this century. Much has been learned since that time concerning the etiology of dental caries and periodontal disease.

In fact, there is convincing albeit indirect evidence, that both dental decay and periodontal disease represent, in many instances, specific bacterial infections[4,5]. If this is so, then it follows that treatment regimens in clinical dentistry should be those which discriminate against Streptococcus mutans, *in the case of dental caries, and against certain anaerobic bacteria such as the spirochetes and black-pigmented bacteroides (BPB), in the case of periodontitis[6,7].*

In the present review the possibility of using the antimicrobial agent metronidazole in the treatment of advanced forms of periodontal disease will be discussed. An argument will be made that the judicious usage of this or similar agents in properly diagnosed periodontal infections may offer the dentist a treatment regimen for periodontal disease that will be cost efficient. However, as with all forms of therapy the clinican has the responsibility to be well informed concerning the agents he is using.

AVANT-PROPOS

Bien qu'elles soient fréquentes chez les adultes, les maladies parodontaires ont été négligées en dentisterie clinique[1]. La meilleure preuve à l'appui de cet énoncé est le revenu que le praticien privé obtient des traitements parodontaires. Ainsi, en 1977, les dentistes américains ont déclaré que moins de un pour cent de leurs honoraires provenaient de la prestation des soins parodontaires[2]. Voilà qui dénote une disparité assez importante entre les principaux besoins dentaires du public adulte et l'apparente inaptitude du dentiste à y répondre.

Si la profession dentaire a négligé les maladies parodontaires, ce n'est pas sans raison. À cause du nombre extrêmement élevé de caries, les dentistes n'ont guère eu l'occasion de s'occuper des autres maladies. Heureusement, en Amérique du Nord, en Scandinavie et dans les pays du Commonwealth[3], les caries ont diminué au point que, maintenant, on croit qu'il y aura trop de dentistes dans certains pays. Toutefois,

cet excédent a trait seulement à la dentisterie restauratrice et non nécessairement à l'ensemble des besoins dentaires du public. C'est pourquoi nombreux sont les dentistes qui, à cause du temps dont ils disposent en trop, devront se recycler pour s'occuper des problèmes parodontaires de leurs patients.

*Par ailleurs, si les maladies parodontaires ont été négligées, c'est parce que les dentistes n'ont pas reçu, en faisant leurs études, des connaissances scientifiques et cliniques assez approfondies dans ce domaine. La plupart d'entre eux ont appris que la plaque dentaire est l'agent responsable tant des caries que des problèmes parodontaires. En conséquence, ils ont cru que le détrartage que l'on recommande régulièrement pour réduire les caries suffisait pour le traitement des maladies parodontaires. Aussi, quand un patient a des culs-de-sac gingivaux moyens ou profonds, de nombreux dentistes multiplient-ils les traitements d'hygiène buccale. Cependant, rien n'indique que l'hygiène buccale peut avoir raison de la parodontite (***voir tableau 3****). Les traitements plus définitifs comme le débridement épithélial des racines avec ou sans opération des gencives sont dispendieux sans être forcément efficaces et dépassent parfois les compétences du praticien général. Devant ces difficultés, le dentiste renvoie ordinairement le patient à un spécialiste.*

Bien que le scénario ci-dessus soit quelque peu simpliste, il décrit de façon générale la situation clinique qui prévaut actuellement dans certaines parties de l'Amérique du Nord et de l'Europe. Il est évident qu'il faudrait songer à faire en sorte que le temps que le dentiste n'utilise pas soit consacré au traitement des maladies parodontaires. Pour y arriver, il faudrait que la parodontologie accède à l'ère moderne. En effet, la plupart des procédures cliniques sont encore fondées sur des principes formulés au début du siècle par Black et Miller qui préconisaient, le premier, l'extension préventive, et le second, le nettoyage des sites de rétention. Depuis, les connaissances se sont multipliées touchant l'étiologie des caries et des maladies parodontaires.

De fait, – et les preuves à ce sujet, bien qu'elles soient indirectes, sont convaincantes, – on croit que les caries et les maladies parodontaires sont, dans de nombreux cas, des infections bactériennes spécifiques[4,5]. S'il en est ainsi, il faut que le traitement vise à détruire, dans le cas de caries, le streptocoque mutans *et, dans celui de la parodontite, certaines bactéries anaérobies comme les spirochètes et les bacteroides à pigments noirs[6,7].*

Dans le présent compte rendu, on étudie la possibilité d'utiliser le métronidazole, un antimicrobien, pour soigner les formes avancées des maladies parodontaires. On démontrera que l'utilisation judicieuse de cet agent ou d'autres agents semblables dans des cas d'infection parodontaire proprement identifiés, peut constituer un traitement qui sera à la fois peu dispendieux et efficace. Toutefois, comme dans toute autre thérapie, il convient que le dentiste soit bien renseigné touchant les agents qu'il utilise.

METRONIDAZOLE

A. Antianaerobic Action

Metronidazole is a nitroimidazole which has remarkable antiprotozoa activity. Since its introduction it has become the treatment of choice for trichomonal and amoebic infections. Its usage in dentistry was described in 1962 by Shinn, who reported its curative effects in cases of acute necrotizing ulcerative gingivitis (ANUG)[8]. Subsequently, a double blind clinical trial was performed that unequivocally established the effectiveness of metronidazole in ANUG[9]. However, these studies did not lead to clinical usage of metronidazole in other periodontal conditions except for pericoronitis[10].

These dental studies occasioned a reevaluation of the antimicrobial specificity of metronidazole. During its preclinical testing, metronidazole had no or little activity against medically important pathogens such as *Streptococcus pyogenes*, *Staphylococcus aureus* and others (**Table 1**). Accordingly, it was not considered to be an antibacterial agent and no claims as such were included in the original drug application. Metronidazole's success in the treatment of ANUG meant either that ANUG was caused by protozoa (a possibility that has not been critically tested), or that metronidazole was active against the bacteria that caused ANUG. As anaerobic bacteria such as spirochetes and fusiforms have been associated with ANUG since Vincent's original observation in the late 19th century[11], studies were performed which determined the effect of metronidazole upon such anaerobes. As shown in **Table 1**, metronidazole at levels of about 1 to 20 μg/ml will inhibit not only spirochetes but all other anaerobic bacteria that have been tested[12,13]. Thus, as a result of the astute clinical observation of Shinn, a new drug effect for metronida-

TABLE 1

Antimicrobial Spectrum of Metronidazole

Organism	MIC μg/ml	
	Aerobic Growth	Anaerobic Growth
Staphylococcus aureus	1000	1000
Streptococcus pyogenes	500	1000
Escherichia coli	1000	1000
Salmonella typhimurium	1000	500
Anaerobes		
Bacteroides fragilis		0.6
Clostridium tetanus		0.3
Fusobacterium polymorphum		0.1
Bacteroides melaninogenicus		1.0
Treponema (small spirochete)		1.0

Adapted from references 12 and 13

TABLE 2

Effect of metronidazole treatment for trichomoniasis during pregnancy on incidence of birth abnormalities.

	Trichomoniasis		All deliveries
	Untreated	Treated	1971-1976
No. of women	283	597	9,629
No. of babies	287	605	9,757
Stillbirths	1.7%	0.5%	1.2%
Congenital abnormalities			
Major	1.7%	1.2%	1.0%
Minor	1.0%	0.8%	0.8%

Adapted from Morgan, 1978. Int. J. Gynaecol. Obst. 15:501-502.

zole was discovered. This antianaerobic action was subsequently approved as a new drug claim for metronidazole by the FDA in 1981.

B. Safety

While these observations were being made a series of events occurred which placed metronidazole in an unfavorable light. Ames and his colleagues developed a relatively simple and reasonably reliable bacterial screening assay for chemical mutagens using the bacterium *Salmonella typhimurium*. Among the chemicals routinely mutagenic in this assay were those that contained a nitro group. Metronidazole contains such a nitro group and would be expected to be mutagenic. Very few antimicrobials have been evaluated by the Ames test because they are lethal for *S. typhimurium*. Metronidazole however is not lethal for this organism (**Table 1**) and upon testing was found to be mutagenic[14].

Agents that are mutagenic in the Ames test are evaluated for tumorigenicity in animal models. Most antibiotics are lethal for rodents when taken daily in high dosages, and accordingly their tumorigenic potential is now known. Metronidazole, however, is well tolerated in dosages as high as 0.6 per cent of the diet, and in fact, can prolong the life span of hamsters[15] and rats[16] at such dosages. In one such high dose study, i.e. about 3,500 times the therapeutic dosage normally used in humans, metronidazole was associated with carcinomas in female but not male mice[17]. The interpretation of this finding was complicated by the fact that some of the animals were moved from city to city during the study and tetracycline was administered to some of the animals. Also, this result has not been reproduced by other investigations. In rats[16], an increase in benign tumors has been observed, but how much of this is due to the increased longivity of the animals has not been determined[18].

These animal studies perhaps would not have raised much concern because of the high dosages involved, the confounding effect of longevity and the extraneous environment conditions present in the mouse study[17] if the issue had not become widely publicized in the lay press. Metronidazole is used primarily in the U.S. for the treatment of vaginal infections and the observed tumorigenicity was primarily in the female animals. This fact was noted by the National Organization for Women (NOW) and various consumer groups who petitioned the FDA to remove this drug from the market. The FDA ruled that the available evidence was not sufficient to ban the drug, but did require that a box warning concerning its carcinogenicity in animal models be included in the drug insert.

Subsequently, two retrospective epidemiological surveys have failed to demonstrate any evidence of increased incidence of tumors among metronidazole users[19,20]. These studies did not include 20-year followup data, so that it may be premature to say that metronidazole is nontumorigenic. Metronidazole is often prescribed during pregnancy for trichomonas infections. Children born to mothers so treated exhibited the same rate of still births and congenital defects as children born to either mothers with untreated trichomonas infections, or all mothers who delivered children during the five-year period of observation[21] (**Table 2**). This suggests that in a very sensitive human system, as well as in animal systems[22] metronidazole is not teratogenic.

C. Summary

The issue of safety cannot be considered in a therapeutic vacuum. In the case of metronidazole the risk to benefit ratio has been evaluated three times, i.e. at the initial drug filing for approval in protozoa infections; in response to the NOW petition for its removal, and during its approval for treatment of anaerobic infections, and each time the FDA approved its usage in properly diagnosed protozoa and anaerobic infections. Goldman in his review of metronidazole[23] notes that if a comparably effective analogue of metronidazole is developed, it will take some 15 to 20 years of usage before we will know if it is at least as safe as metronidazole.

TREATMENT OF ANAEROBIC PERIODONTAL INFECTIONS

In recent years the essential role of bacterial plaque in initiating and propagating a host inflammatory response in the periodontal tissues has been documented in animal models[1,24]. Moreover, there appears to be an element of bacterial specificity in these periodontal infections as spirochetes[6,25] and black-pigmented bacteroides (BPB)[7,26] are significantly elevated in plaques removed from sites of periodontitis and *Actinobacillus actinomycetemcomitans* is either present in high proportions in plaques taken

TABLE 3

Effect of Oral Hygiene, Dental Scalings and Systemic Metronidazole Alone or in Combination Upon Selected Periodontal and Bacterial Parameters. Half Mouth Design.

Measured Parameters	Metronidazole[a] & Oral Hygiene		Oral Hygiene	
	Scaled[b]	Unscaled	Scaled	Unscaled
% Frequency of Sites with Pocket Depth ≥ 7 mm				
Initial	66%	70%	72%	73%
After 50 wks	0	0	0	67
% Frequency of Sites with Pocket Depth ≤ 4 mm				
Initial	0%	0%	0%	0%
After 50 wks	75	25	50	0
Change in Attachment Level				
After 50 wks	+ 1.8mm	+ 0.8mm	+ 1.6mm	– 0.3mm
Proportions of Spirochetes				
Initial	35%	33%	38%	45%
After 50 wks	1	11	9	32
Proportions of Cocci				
Initial	36%	39%	29%	31%
After 50 wks	86	76	75	35
Size of Inflammatory Cell Infiltrate (ICI)[c]				
Initial	2.7	2.8	2.8	2.8
After 50 wks	0.3	1.0	0.5	2.1

a 200mg qid for 3 periods of 2 weeks each separated by intervals of 8 weeks.
b approximately 4 visits during the initial 2-week period.
c ICI 0 = scattered areas of leukocytes adjacent to j.e.
1 = leukocytes in a thin band within rete-peg area.
2 = dense infiltrate of leukocytes which has replaced the collagen fibers lateral to epithelium.
3 = generalized dense accumulation of leukocytes which has replaced collagen.
Adapted from Lindhe *et al.*, 1983. J. Clin. Periodontal *10*: 100-112.

from sites of bone loss in patients diagnosed as exhibiting localized juvenile periodontitis[27], or rapidly progressing periodontitis[28]. Peripheral blood taken from periodontal patients revealed significant increases in specific antibodies to the above organisms[29,30].

A. Specific Plaque Hypothesis

The statistical association of certain organisms with clinical signs of active disease, i.e. bleeding upon probing, bone loss, suggests that the observed lesions may actually reflect a "specific infection" involving these or possibly yet to be identified bacterial species. These observations led to the formulation of the specific plaque hypothesis (SPH) which views certain plaques as having been periodontopathic because they are colonized and/or dominated by one or more bacterial types. These bacterial types are presumed, on the basis of association-type data and animal studies, to be responsible for a measurable amount of periodontal tissue destruction[4,31]. The SPH does not state that these bacterial species are responsible for all forms of periodontal disease, but rather that they are responsible for a measurable amount of the tissue destruction with the expectation that this amount will be biologically and clinically significant. Implicit in the SPH is the concept of a nondisease-associated plaque[4]. For practical purposes, the non-disease associated plaque is simply plaque which is either not colonized and/or dominated by the known or suspected periodontopathogens. It can be readily identified by microscopic examination as plaque that is dominated by cocci and nonmotile rods[25].

Black-pigmented bacteroides species (BPB), such as *Bacteroides gingivalis* and *Bacteroides intermedius* and spirochetes are invariably elevated in periodontopathic plaques to the extent that if they are not contributors to the pathogenesis, they at least are diagnostic indicators of active disease[26]. All the known oral species of BPB and spirochetes are anaerobes which suggest that antimicrobial treatment directed specifically against anaerobes might be effective in periodontal therapy. The efficacy of the metronidazole in ANUG[8,9] led to the discovery that metronidazole has a unique bacteriocidal action against anaerobes[12]. Subsequently it was shown that the curative effect of metronidazole in ANUG was associated with the significant and sustained suppression of spirochetes and *B. intermedius* in plaque samples removed from the ANUG lesions[32].

This action of metronidazole against the type of anaerobes associated with active periodontitis led to a clinical trial of metronidazole in selected periodontitis patients[26]. A one-week treatment of metronidazole with and without scaling was associated with a sustained suppression of *B. gingivalis* and spirochetes for periods of six months or more. In addition, the sites with an initial probing depth of 6 mm or more exhibited a probing depth reduction of about 2 mm and an apparent attachment gain of 1.5 mm.

In both the ANUG and periodontitis studies, patients with elevated proportions of anaerobes in their subgingival plaques were successfully treated with metronidazole. While the reduction in proportions of plaque anaerobes and the obvious clinical improvement appeared to be related, the findings in theory could have been coincidental. This issue was resolved by clinical studies using appropriate control groups.

B. Controlled Clinical Trials of Metronidazole

Two clinical trials of metronidazole in which anaerobic periodontal infections were diagnosed and control groups were used have been reported[33,34]. Lindhe and his colleagues have shown, using a half mouth clinical design, that the elimination of metronidazole-sensitive bacteria from the subgingival microbiota resulted in the disappearance of clinical and histopathological signs of periodontal disease[33]. Loesche and his colleagues, using a double blind clinical design, have shown that one week usage of metronidazole plus mechanical debridement of the root surfaces is superior to one week usage of placebo plus mechanical debridement in reducing the number of sites that initially exhibited > 7 mm pocket depths and apparent attachment loss[34]. Both studies will be reviewed as to the information they provide concerning the possibility of modifying periodontal disease by altering the oral micro flora.

1. Half-Mouth Study

Sixteen patients with advanced periodontal disease, i.e. about 70 per cent of the pockets had pocket depth > 7 mm and whose subgingival plaque averaged about 35 per cent spirochetes (**Table 3**), were randomly divided into two groups. The patients of the test group received 200 mg metronidazole four times daily for three periods of two weeks each, separated by intervals of eight weeks. The patients of the control group received no antibiotic treatment. All patients received detailed oral hygiene instructions and practice in the use of proper tooth cleaning methods. They also received a series of four scalings involving two quadrants of the dentition which were scheduled during the initial two-week period. This design permitted the comparison of metronidazole with or without scaling to scaling alone and oral hygiene alone.

The results obtained 50 weeks after the initialization of treatment are summarized in **Table 3**. Both mechanical debridement and metronidazole significantly reduced pocket depth and increased apparent attachment relative to the oral hygiene group. The best clinical results were obtained when the two treatment modalities were combined. Scaling alone was superior to metronidazole in regard to an apparent increase in attachment level and to the size of the inflammatory cell infiltrate. Both metronidazole and scaling were comparable in their abilities to suppress the spirochetal flora (**Table 3**). Oral hygiene procedures although regularly monitored and reinforced has little effect on the periodontitis.

Mechanical debridement of the root surfaces is the essential component of all periodontal therapy. Yet in this study, it could be omitted and clinical improvement of a substantial nature could still be obtained by the usage of systemic metronidazole. This would "emphasize the central role played by the anaerobic segments of the subgingival plaque for the maintenance of the inflammatory component of periodontal disease"[33]. The fact that mechanical debridement alone was successful would imply that it also has a specific effect upon the anaerobic members of the subgingival plaque. This proved to be the case as will be described subsequently.

2. Double Blind Clinical Study.

In the above study, the identity of the metronidazole patients was known to both the patient and the clinician. While each patient served as his own control, there is the possibility that some degree of bias could enter into such a study. Also, if there were any systemic immunological effects as a result of scaling, these could theoretically influence the measured parameters on the unscaled side. These potential problems can be minimized in a double blind study in which neither the patient nor the clinician is aware of the drug that was used. However, because different patients are used in each group, it is often difficult to match the patients exactly in regard to the measured parameters.

We have conducted a double blind study in which patients with advanced periodontitis were given the necessary mechanical debridement of their root surfaces plus either one week of systemic metronidazole (250 mg tid) or placebo (250 mg tid). The week of medication was initiated during the first scaling visit. In this design, only the added benefits of metronidazole relative to mechanical debridement can be shown.

Metronidazole treatment was of value primarily in those pockets that initially were ≥ 7 mm deep and/or had ≥ 7 mm attach-

ment loss. Thus, the metronidazole and mechanical treatment reduced the pockets by 3.2 mm and increased apparent attachment by 1.4 mm (**Table 4**). The placebo and mechanical treatment was significantly less effective in this regard.

It is well known that the therapeutic efficacy of mechanical debridement decreases appreciably at pockets greater than 6 mm due to the inaccessibility of deep root surfaces and furcations to instrumentation. Indeed, this is the justification for surgical intervention in such sites. However, these sites in this double blind study were apparently bathed by sufficient levels of metronidazole that a significant improvement in apparent attachment gain and pocket reduction occurred, to the extent that surgery was not necessary in some cases.

The reasons for the apparent clinical effectiveness of metronidazole was sought for in an analysis of the bacterial composition of the subgingival plaque taken from representative disease sites in each quadrant. Treatment in both groups reduced the amount of plaque that could be recovered. The proportions of total spirochetes decreased significantly in the metronidazole group relative to the placebo group in the period immediately post medication. However, 15 to 30 weeks after the medication, there was no apparent difference between the groups (**Table 4**). This was not the case for the large spirochete. These organisms were significantly lower in the metronidazole patients due to both a sustained reduction in the metronidazole patients and a proportional increase in the placebo patients (**Table 4**).

As such, this difference in large spirochetes was the only observed microbiological difference observed between the two groups of patients. This suggested that the metronidazole plus mechanical debridement was able to eliminate or to suppress the levels of the large spirochete initially to the extent that regrowth or recolonization did not readily occur. Whether this absence of the large spirochete in the returning flora was responsible for the improved clinical health in the metronidazole patients is a subject of current investigation. In this regard, it should be noted that only a few of the many anaerobic species present in plaque[35] are identified by our bacteriological methods. Thus unidentified anaerobes such as *Eubacterium* sp. and *Peptostreptococcal* species should have been suppressed by metronidazole, but the duration of this suppression was not documented.

C. Mechanical Debridement

The control groups in both the half mouth and double blind metronidazole studies showed that mechanical debridement *per se* discriminated against the anaerobic flora. Thus there was an impressive decline in the proportions of spirochetes in the scaling only group (**Table 3**) and in the proportions of *B. gingivalis* in the placebo group (**Table 4**). Other studies have shown that mechanical debridement selects for cocci and rods and discriminates against spirochetes[36]. In fact, it takes about six weeks or more for the spirochetes to return to pretreatment level. However, if the mechanical debridement is repeated at frequent intervals, the spirochetes are either low or undetectable in the plaque[37].

It may be that nonspecific treatments such as scaling and root planing are successful to the extent that they can eliminate and/or suppress the emergence of an anaerobic flora and select for a facultative flora. If so, then their mechanism of action is comparable to the mechanism of action of metronidazole i.e. the conversion of a periodontopathic flora to a nondisease-associated flora by the deletion or suppression of certain anaerobic organisms.

We know that mechanical debridement has to be repeated at frequent intervals in order to maintain periodontal health[38]. This undoubtedly reflects the inability of debridement to completely rid the tooth and/or epithelia surfaces of the infection. We also know that mechanical access is limited in sites of deep pocketing and furcations. The amount of time necessary to thoroughly debride root surfaces of an infection is often a disincentive to either the patient or the dentist. It is these drawbacks of mechanical debridement which can be addressed by antimicrobials. This is shown in the two described studies where the combination of mechanical debridement and metronidazole were clearly more effective than either treatment alone. And the combination of mechanical debridement and antimicrobial therapy has all the appearances of being cost effective.

IV. SUMMARY

The major dental problem of adult populations, namely periodontal disease, appears to be a treatable anaerobic infection. This realization and the means to treat it are occurring during a major change in the dental needs of the public. The now very apparent decline in dental caries will create time in the dentist's schedule, which can be devoted to the treatment of periodontal disease. The traditional mechanical debridement procedures can be supplemented by the judicious usage of agents such as metronidazole, so as to achieve clinical results hithertofore considered propitious but which now may be considered to be expected. The usage of these powerful chemical therapeutic agents however must be responsible.

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TABLE 4

Effect of Metronidazole or Placebo Treatment Superimposed Upon Mechanical Root Planing

Measured Parameters	Metronidazle & Scaling	Placebo & Scaling
	Sizes ≥ 7mm or More Initially	
Change in Pocket Dept	-3.2mm	-1.6mm
Attachment Distance	+1.4	+0.2mm
Proportions of Spirochetes		
Initially	27%	29%
After 15-30 weeks	20	29
Proportions of Large Spirochetes		
Initially	3.0%	4.0%
After 15-30 weeks	1	11.0
Proportions of *B. gingivalis*		
Initially	9.4%	11.6%
After 15-30 weeks	0.9	2.0

Values connected by arrows are significantly different

Adapted from Loesche *et al.*, 1984 J. Periodontol. *55*

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SPLINTING
OF MOBILE TEETH USING LIGHT CURED COMPOSITE RESIN: A CLINICAL EVALUATION OF REINFORCED AND NON-REINFORCED SPLINTS

D.H. Charles, BSc, DDS
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ABSTRACT

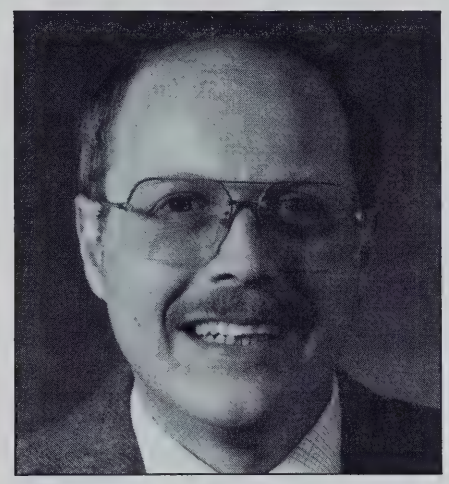
Long-term stabilization of mobile teeth is best attained using conventional cast restorative techniques. However, the clinical procedure is time-consuming, expensive and irreversible. This article deals with the clinical evaluation of two splinting techniques employing light-cured composite resins, one reinforced, the other, not. Both methods displayed equal durability and had the immediate and dramatic effect of eliminating mobility. For mobile teeth of doubtful periodontal prognosis, these splinting techniques provide an inexpensive method of improving the patient's "masticatory confidence" and comfort.

SOMMAIRE

Pour bien stabiliser les dents mobiles, il convient de recourir aux techniques conventionnelles pour les modèles de restauration. Toutefois, la procédure clinique exige beaucoup de temps, coûte cher et est irréversible. Dans cet article, on évalue deux techniques de fixation avec des résines composites polymérisées, l'une renforcée et l'autre non. Les deux méthodes se sont révélées également efficaces et ont arrêté instantanément la mobilité. Pour les dents mobiles dont le pronostic parodontaire paraît douteux, ces méthodes de fixation sont des moyens peu dispendieux d'améliorer le confort du patient et de lui redonner confiance pour la mastication.

INTRODUCTION

Dental literature is replete with articles on methods for stabilizing mobile teeth, reflecting the profession's concern for this condition and its treatment.[1-17] For the most part, this treatment activity has been directed towards excessive tooth mobility due to loss of periodontal support. Recently, the profession's preoccupation with stabilization



of periodontally weakened teeth has been challenged. Various investigators[18-20] have suggested that loose but periodontally healthy teeth may be better maintained without stabilization. Additionally, the suspected etiologic relationship between the occlusal trauma and periodontal disease has come under scrutiny. There are, nevertheless, a variety of clinical conditions involving loose teeth that are well served by splinting. Situations for which splinting is indicated include:[20-22]

1) protection of traumatized teeth from further injury
2) retention of orthodontically moved teeth
3) when masticatory comfort and function are impaired by tooth mobility
4) to maintain conditions in which ultimately the teeth may have to be lost, thus making gradual the transition to edentulousness.

Long-term splinting of periodontally involved teeth is best attained using conventional fixed cast restorative techniques. Clinically, the procedure is time-consuming, expensive and irreversible, because of the inherent sacrifice of a good deal of calcified tissue.

Less costly, quicker and frequently reversible splinting procedures utilizing various resin restorative systems have gained increasing use within the profession. Generally, resin splints have been used most often for short-term conditions.[13-17] Reinforcement of the resin with a variety of materials has offered some improvement to its durability and longevity.

The major drawback to reinforced splints is their frequently unacceptable bulk and attendant unhygienic qualities of plaque retention and stain collection. The purpose of this investigation was to evaluate an alternative approach to conventional reinforcement using the higher strength microparticle filled resin systems on minimally prepared and etched enamel. In this study, the principal reason for splinting was to reduce tooth mobility and improve the patients' masticatory comfort and function.

METHOD

The patients for this study were chosen from a pooled group of subjects who, as closely as possible, demonstrated clinically similar periodontal conditions. In general, patients were randomly assigned for the type of splint. However, where a removable partial denture featuring a lingual plate major connector was being worn or treatment planned, an interproximal splint was of necessity placed. This occurred with five subjects.

Initial assessment included recording the status of the patient's periodontal health. This included:

(1) Long cone (paralelling technique) radiographs of the teeth to be splinted;
(2) Periodontal pocket depth measurement using a Michigan style periodontal probe;
(3) Tooth mobility measurements using Miller's[23] method. Miller describes the clinical measurement of tooth mobility by using three numerical categories as follows:

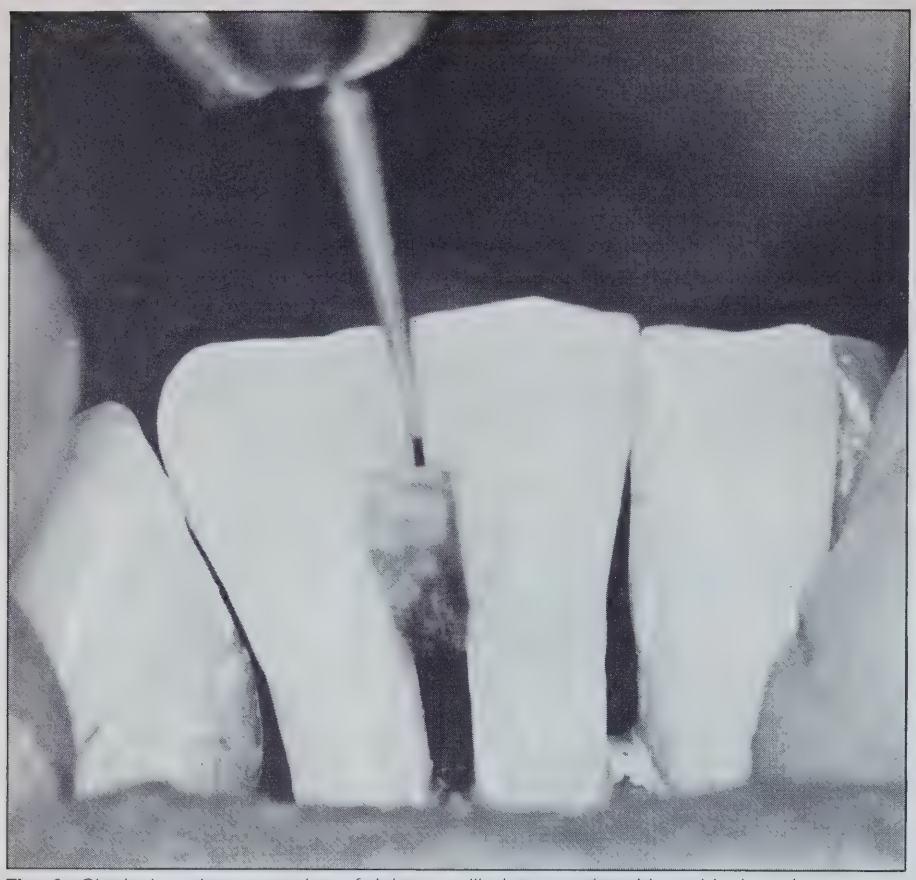


Fig. 1. *Gingival wedge separation of right mandibular central and lateral incisors in preparation for interproximal diamond point instrumentation.*

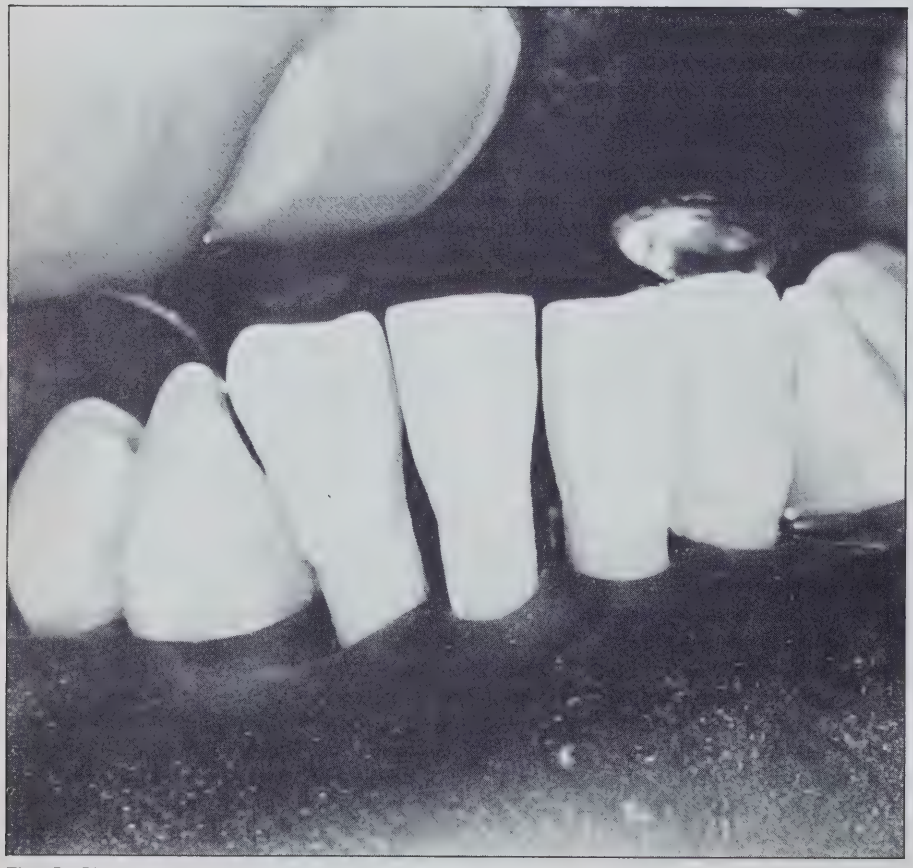


Fig. 2. *Photocure of bonding resin by visible light.*

Category

1. First distinguishable sign of tooth movement greater than normal.
2. A1 mm movement of the tooth in any direction from its normal position.
3. A movement of the tooth in excess of 1 mm in any direction from its normal position.

This assessment was considered necessary in order to detect deleterious changes in periodontal health. The study was not designed to evaluate periodontal health with the wearing of splints.

All patients receiving splints also underwent extensive oral hygiene instruction, including the use of floss threaders in connection with three-ply nylon yarn for interproximal cleansing. Prior to placing the splint, the enamel surfaces of the teeth to be bonded were thoroughly scaled and polished.

Splints were placed according to one of the following methods:

1) Fiberglass reinforced splints were constructed according to the method described by Friskopp et al.[15] for 30 teeth (24 joints). The technique involves the individual bonding of three to four strands of flat fiberglass bands soaked in a light activated B15-GMA resin to previously etched enamel surfaces. The fiberglass bands were obtained from commercially available fiberglass cloth.
2) Sevens plints for 42 teeth (35 joints) were placed using the following procedure:

a) The interproximal contacts of the teeth to be splinted were reduced, using a finely tapered diamond point in a high speed hand piece to give an interproximal separation for approximately 1 mm (**Fig. 1**). The area of reduction was confined to the enamel.
b) The teeth were isolated under rubber dam.
c) The enamel etchant was applied to the lingual and proximal surfaces of the teeth.
d) The bonding agent was brushed on the etched enamel and cured using a visible light-emitting unit. Care had to be exercised not to form a joint between the teeth with the bonding agent (**Fig. 2**).
e) Filled composite resin was placed interproximally over the bonded enamel and cured with visible light emitting unit, creating an "I" bar of microparticle filled resin, interproximally. Due to the thickness of the resin, light had to be applied to both labial and lingual surfaces for the minimum curing time.

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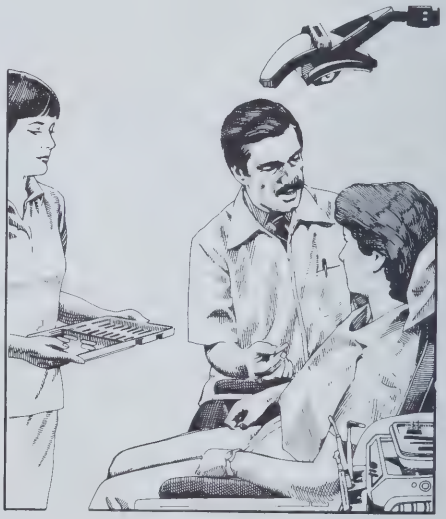

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f) Splints were trimmed with multifluted carbide burs and polished with discs of diminishing coarseness (**Figs. 3 and 4**).

Patients were recalled at one month and then, where possible, followed on a six month basis, at which time splint integrity was assessed and periodontal health monitored. Additionally, oral hygiene was reviewed and scaling and polishing of the teeth in the splint were performed as required.

RESULTS

Twelve splints joining 72 periodontally weakened teeth were made and observed for an average of 16 months. Seven splints were of the Interproximal-I-Bar (I.P.-I.B.), uniting 42 teeth with 35 joints, and five splints of the fiberglass reinforced type uniting 30 teeth with 24 joints (**Table 1**). Both techniques had the immediate and dramatic effect of eliminating tooth mobility.

Three of the five fiberglass splints experienced joint fractures during the period of observation. Two of these suffered two-joint failures, the other, one-joint failure. No fiberglass splint failed during the first five months of service. Failures, once repaired, did not fracture again during the period of observation.

Three of the seven I.P.-I.B. splints also experienced joint fracture during the study. Two of these suffered two-joint failures, with the same joint in one splint failing twice. The other I.P.-I.B. splint had three failures in different joints, and once repaired did not fail again.

TABLE I

Results

	TYPE OF SPLINT	
	REIN-FORCED FIBER-GLASS	INTER-PROX-IMAL "I"-BAR
Number of splints placed	5	7
Number of teeth splinted	30	42
Number of splinted joints	25	35
Number of splints remaining intact	2	4
Number of splints partially intact	3	3
Total number of failed joints (initial)	5	6
Number of joints failing after repair	0	2
Average period of observation (months)	12	18.5

Fig. 3. *Trimming excess composite material with composite finishing bur.*

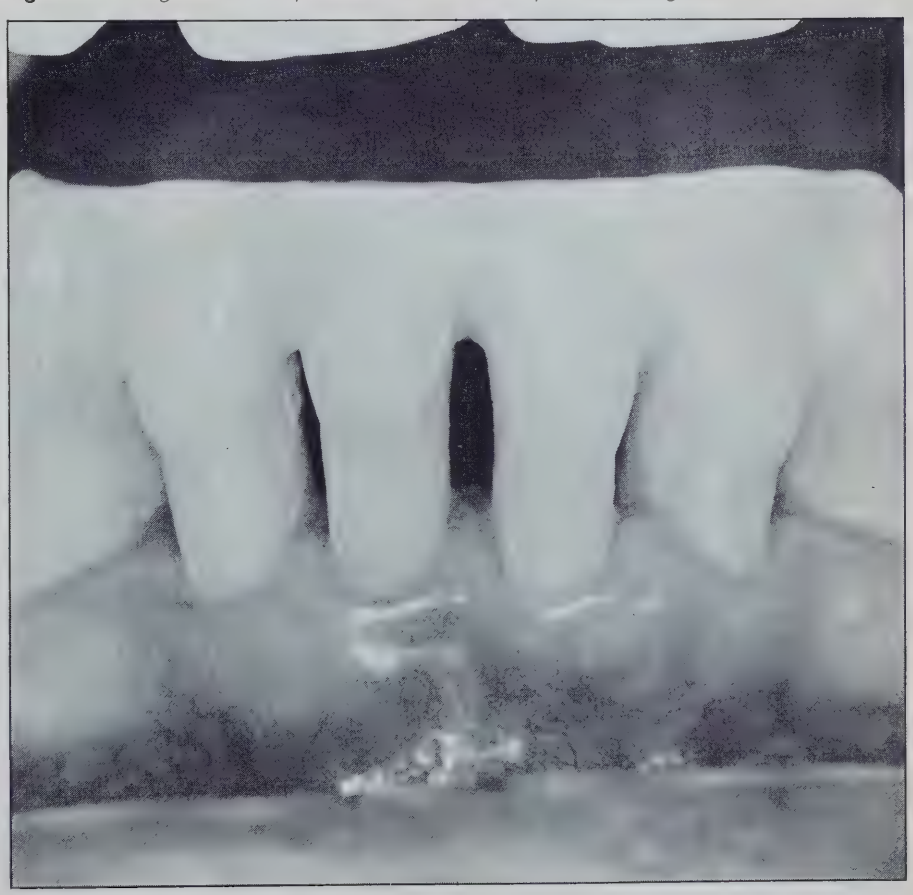

Fig. 4. *Completed composite splint.*

Fig. 5. *Lingual view of splinted teeth (30 month recall).*

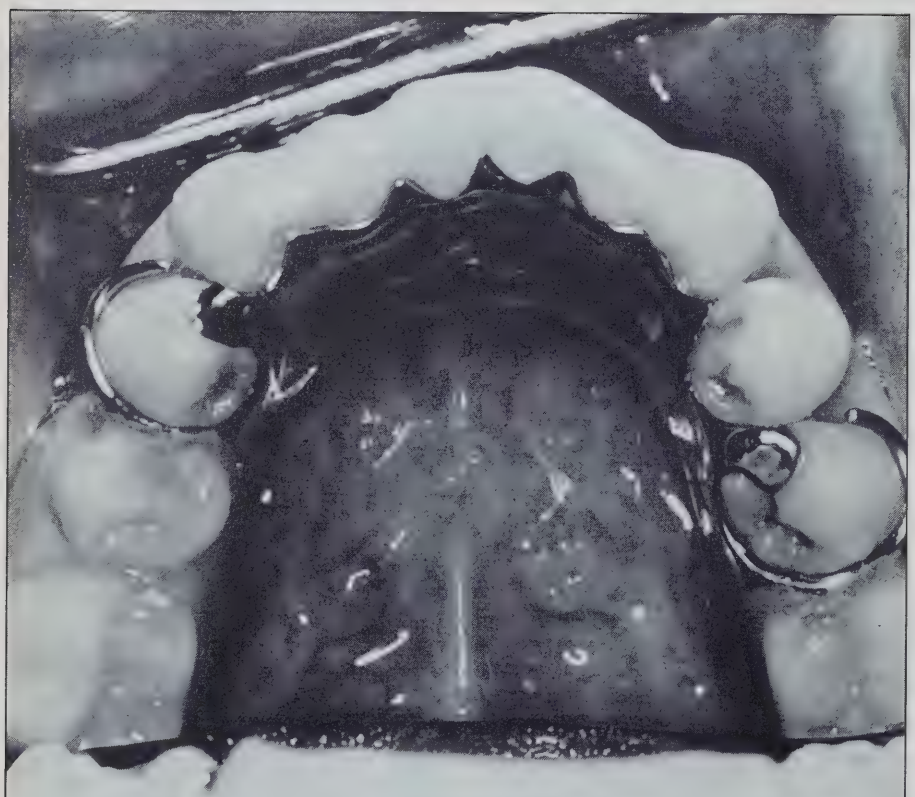

Fig. 6. *Partial low denture featuring lingual plate in place on splint (30 month recall).*

DISCUSSION

On the basis of the results, it is apparent that both splinting methods are equally effective. This, in the author's view, is due to the large number of uncontrollable variables in a clinical study of this nature.

Tooth mobility occurs as a result of various influences; Chief among them the degree of occlusal function. Perhaps equally important is the quality of the periodontal support. Also, other factors such as periodontal disease and the patient's systemic condition play a role. No subject in this study presented with identical periodontal conditions, and this was not anticipated. Clinical methods of assessment were used, as there are presently no known scientific methods that allow for a more accurate comparison of periodontal status. For example, long cone periapical radiographs are only capable of demonstrating the highest level of interproximal bone. No interpretation can be made about the labial or lingual bone level, nor can interseptal defects be determined; only an approximate estimation of bone level can be made. From this, the quality of bone support is extrapolated. Perhaps this is as it should be, in that the clinician must presently make similar decisions on the basis of available techniques.

Acid-etch splints fabricated with light cured microparticle filled composite provide the dentist with a quick, economic and effective method for the stabilization of periodontally weakened and mobile teeth. This approach is especially useful when the periodontal prognosis is doubtful.

The fiberglass reinforced splints took longer to place than the I.P.-I.B. type. This was largely due to the extra time spent in "tacking down" the fiberglass strands to the teeth. Also, finishing procedures took longer, as it was more difficult to effectively smooth over the finished splint due to the irregular surface texture produced by the fiberglass-composite combination. Additionally, the lingual placement of the splint made it more bulky than the I.P.-I.B. type. The combination of bulk and rougher surface texture tended to make this splint more plaque retentive. Its chief advantage over the I.P.-I.B. was that it required no mechanical preparation of the tooth surface.

The interproximal splints described have been referred to as interproximal "I-Bar" Splints, characterized by interproximal struts of resin material joining composite filled labial and lingual embrasures. The I.P.-I.B. splint had a number of advantages. It was a relatively conservative and inexpensive procedure, and the porcelain-smooth surface was easily maintained virtually plaque free. Maximum composite thickness interproximally afforded enhanced durability. When proximal carious

lesions or restorations existed, they could be incorporated into the splint, increasing splint bulk and therefore strength of the joint.

One of the major advantages of the I.P.-I.B. splint, particularly for mandibular anterior teeth, is that it does not impinge appreciably on the lingual surfaces of the teeth, thereby allowing "lingual strapping" in a removable partial denture case (**Figs. 5 and 6**).

Both splint types suffered joint fractures, particularly in situations where the teeth were extremely loose and/or there was inadequate posterior occlusal support. It was not possible to establish the exact time of failure. None of the patients with partially intact splints were aware of the fractures; these were only detected at recall evaluation.

In all cases, repairs were easily accomplished, without the necessity of removing all the remaining composite material. The surface to be repaired was "freshened" by light grinding with a diamond instrument and subsequently, etched with phosphoric acid for a 60-second period. Phosphoric acid not only created micropores on the enamel surface, but also removed the salivary protein contaminant layer from the adjacent composite surface; thereby resulting in a throughly cleaned surface to which resin bonding could readily occur. After washing and careful drying, a thin layer of bond resin was applied to the enamel and/or composite surface, and light cured. Repair composite was then added in the usual manner, cured and finished.

SUMMARY

Two types of temporary splinting methods using acid-etch light cured composite materials to immobilize periodontally weakened teeth were evaluated. Five fiberglass reinforced and seven Interproximal-I Bar splints were made and followed up for an average of 16 months. During the period of observation, three of the fiberglass reinforced splints suffered partial failure, while two remained intact. Three of the Interproximal-I Bar splints underwent partial failure, while four of these remained intact.

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CLINICAL EVALUATION

OF COMPOSITE RESIN AND AMALGAM POSTERIOR RESTORATIONS: THREE YEAR RESULTS

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Alan S. Richardson, DDS, MSc
Vancouver, B.C.
Roy Waldman, DDS
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ABSTRACT

The purpose of this study was to clinically evaluate the effectiveness of one- and two-surface composite resin restorations in posterior teeth. Using a half-mouth study design, 101 children received right and left pairs of composite resin and silver amalgam restorations. The teeth were prepared for both materials by final year dental students, using standardized techniques: rubber dam, 90° cavo-surface margins, etc. The materials used were capsulated Dispersalloy (Johnson and Johnson) and Profile (S.S. White). The amalgam capsules were mechanically triturated, condensed, carved and finished by the individual operators. One operator dispensed, mixed and directed the insertion of all Profile restorations. After three years, 126 one-surface and 58 two-surface restorations were clinically evaluated by one examiner. Radiographic examination was conducted on 19 multi-surface restorations. Criteria for evaluation were: sound, chipped margins, fractured material, occlusal wear, caries, needs replacing, replaced and marginal discolouration. The percentage of composite resin restorations remaining sound was 46 and amalgam 80 per cent. Twenty composite resin restorations showed occlusal wear alone, another nine had occlusal wear plus marginal discolouration and five were replaced, compared with only two amalgams. Nine composite resin restorations and 13 amalgam restorations had chipped margins. After three years, posterior teeth restored with composite resin (Profile) are inferior to those restored with silver amalgam (Dispersalloy), due mainly to occlusal wear.

SOMMAIRE

Le but de cette étude a été d'évaluer en clinique l'efficacité des restaurations faites avec de la résine composite sur une surface et sur deux surfaces de dents postérieures. L'étude a été effectuée sur une moitié de la denture. Ainsi des dents de 101 enfants ont été obturées par paire, à droite et à gauche, avec des amalgames de résine composite et d'argent. Avec des techniques ordinaires: digues en caoutchouc, rebords cavo-superficiels de 90°, etc., des étudiants de dernière année ont préparé les dents pour les deux matériaux: les amalgames Dispersalloy (Johnson and Johnson) *et* Profile (S.S. White) *présentés en capsule. Les capsules d'amalgame ont été triturées mécaniquement, puis condensées, sculptées et polies par des opérateurs particuliers. L'un d'eux a procédé à la distribution, au mélange et à la direction de l'insertion de toutes les restaurations à l'amalgame* Profile. *Trois années plus tard, un examinateur a évalué en clinique 126 restaurations sur une surface et 58 restaurations sur deux surfaces. De plus, un examen radiographique a été effectué sur 19 restaurations faites sur plusieurs surfaces. Les critères d'évaluation ont porté sur les points suivants: la solidité, les marges ébréchées, les fissures dans le matériau, l'usure occlusale, les caries, les remplacements exigés et la décoloration. Les restaurations à la résine composite sont restées solides dans une proportion de 46 pour cent et celles à l'amalgame dans une proportion de 80 pour cent. Vingt restaurations à la résine composite portaient des traces d'usure occlusale, neuf autres présentaient des traces d'usure occlusale et des rebords décolorés, cinq avaient dû être remplacées. Dans les restaurations à l'amagame, on comptait deux remplacements seulement. Neuf restaurations à la résine composite et 13 à l'amalgame avaient des marges ébréchées. Bref, après trois ans, les restaurations effectuées sur les dents postérieures avec de la résine composite* (Profile) *sont, à cause de l'usure occlusale surtout, inférieures aux restaurations à l'amalgame d'argent* (Dispersalloy).

INTRODUCTION

In 1979, a long-term clinical study on a posterior composite resin restorative material was initiated in Vancouver. The one[1] and two[2] year results have been reported. The results of the third year examinations are presented and discussed in this article.

METHOD AND MATERIALS

Using a half-mouth study design, 101 children received right to left pairs of composite resin and silver amalgam restorations in both primary and permanent posterior teeth. All study teeth were fully erupted and in occlusion. The teeth were prepared for both materials by final year dental students working at the University of British Columbia. Standardized procedures were followed: rubber dam, 90° cavo-surface margins, removal of unsupported enamel, mechanical matrix with wedge, etc. The materials used were capsulated Dispersalloy* and Profile**. The amalgam capsules were mechanically triturated, condensed, carved, and finished by the individual operators. One operator dispensed, mixed and

*Johnson & Johnson Co.
**S.S. White Co.

directed the insertion of all Profile restorations following the manufacturers' instructions. A 30 per cent orthophosphoric acid etch was placed on the dried surface enamel for 90 seconds. Following washing and drying, the preparation and surface enamel were coated with the bonding agent. Using a syringe, the composite resin was placed in the preparations to a slight overfill and left uncovered for three to five minutes for curing. After Proximal metal matrix bands were removed, the composite resins were trimmed with 12-bladed burs as indicated by the individual occlusion. Central fossae were not accentuated and no attempt was made to include supplemental grooves. Postoperative bite-wing radiographs were taken for all interproximal restorations.

Using mouth mirror, portable light and explorers, the restorations were re-evaluated at 12 months, 24 months and 36 months by one clinician in school health rooms. Criteria for evaluation are described in **Table I**. When possible, bite-wing radiographs were taken for those children in whom interproximal restorations were placed.

RESULTS

Thirty-six months after insertion, 94 composite resin and 90 amalgam restorations were available for evaluation in posterior, primary and permanent teeth (**Table II**). The composite resin restorations included 59 occlusals, 10 buccals or linguals, 13 occlusal linguals or occlusal buccals, 8 two-surface Class II's and 4 three surfaces or more. The amalgam restorations included 47 occlusals, 10 buccals or linguals, 14 occlusal linguals or occlusal buccals, 11 two-surface Class II's, and 8 three surfaces or more.

Forty-three of the 94 composite resin restorations were sound after three years – a success rate of 45.7 per cent (**Table III**). Of the 90 amalgam restorations, 72 remained sound – a success rate of 80 per cent. Twenty composite resin restorations showed occlusal wear alone. Six of the composite resin restorations were replaced, compared with two amalgams. Two composite resin restorations and two amalgams needed replacing. Seven composite resin restorations and eight amalgam restorations were in primary teeth.

Bite-wing radiographs were obtained from 10 children, showing 13 composite resin restorations and 16 amalgam interproximal restorations. Criteria used for evaluation were sound (free of defects) gingival overhang, voids, poor contour, caries, open margin, replaced and exfoliated. Five of the composite resin restorations were sound, two demonstrated caries, one showed an open margin, four were replaced and one exfoliated. Twelve of the amalgam restora-

TABLE I

Criteria for Evaluation of Amalgam and Composite Restorations

CRITERIA	DESCRIPTION
1. Sound	Functional, without defects
2. Chipped margin	Void, due to loss of material or enamel
3. Fractured	Detectable fracture through the material
4. Occlusal wear	Visible facets or dishing out
5. Caries	Caries at margin of restoration
6. Needs replacing	Extensive defect, large void, no contact
7. Replaced	Original restoration has been replaced
8. Margin discoloured	Obvious staining at cavo surface margin
9. Occlusal wear and discolouration	Criteria 4 and 8

TABLE II

Amalgam and Composite Restorations Evaluated Clinically Three Years After Placement

MATERIAL	SURFACES						TOTAL
	ONE		TWO		THREE	FOUR	
	Occlusals	buccals	O-B MO's & O-L DO's				
Amalgam	47	10	14	11	6	2	90
Composite resin	59	10	13	8	3	1	94

TABLE III

Condition of Amalgam and Composite Restorations Three Years After Insertion

RESTORATIONS	CONDITIONS									TOTALS
	1	2	3	4	5	6	7	8	9	
Amalgam										
Occlusal	39	7	0	0	0	1	0	0	0	47
Buccal and lingual	10	0	0	0	0	0	0	0	0	10
OL and OB	13	0	0	0	0	1	0	0	0	14
Class II	6	5	0	0	0	0	0	0	0	11
3 Surface	3	0	0	0	1	0	2	0	0	6
4 Surface	1	1	0	0	0	0	0	0	0	2
Totals	72	13	0	0	1	2	2	0	0	90
Composite resin										
Occlusal	27	6	0	14	0	0	3	3	6	59
Buccal and lingual	9	0	0	1	0	0	0	0	0	10
OL and OB	5	3	0	1	0	1	0	2	1	13
Class II	2	0	0	2	0	0	2	0	2	8
3 surface	0	0	0	2	0	0	1	0	0	3
4 surface	0	0	0	0	0	1	0	0	0	1
Totals	43	9	0	20	0	2	6	5	9	94

tions were radiographically sound, one showed caries, one an open margin, one a gingival overhang and one was replaced.

DISCUSSION

The composite resin, Profile, compared favourably with the amalgam Dispersalloy, one year after placement in posterior primary and permanent teeth.[1] The decrease in the acceptability of Profile that appeared after two years[2] was greater after three years, when only 43 of the 94 Profile restorations were deemed sound while 72 of the 90 Dispersalloy amalgam restorations were sound (**Fig. 1**). The principal factor in the failure of Profile was occlusal wear, with or without marginal discolouration. Lienfelder et al.[3] also reported occlusal surface wear of Profile restorations after two years and concluded that the material be excluded from surfaces involving centric stops. In Class II's restored with a carvable composite resin, occlusal wear was reported by Tonn et al.[4]. Nelson et al.[5], however, did not observe occlusal wear of a composite resin placed in primary teeth after two years but did after three years.

The 25 per cent of Profile restorations exhibiting clinical wear in this study after two years increased to only 30 per cent after three years. When wear and marginal straining are totalled, the percentages after two and three years are similar. This levelling-off effect helps explain why some occlusal composite resin restorations function well for many years. The one to two year wear in 30 per cent of the composite resin restorations may result in the re-establishment of an enamel-to-enamel contact, with reduced abrasion forces on the material. Few of the composite resin restorations in this study with wear and/or marginal staining had recurrent caries or required replacement – they were in reality functional. As clinical judgement was used in recording occlusal wear, some error does exist. However, interexaminer error was eliminated by using the same examiner at all examinations.

Porosity is a factor in the rate of wear of composite resins.[6] The greater the porosity, the greater the wear. Individual mixing for each restoration produces variations in porosity, explaining in part why some restorations wear and others do not. Placement of light-cured composite resin materials with a syringe has been shown to reduce porosity *in vitro* and it may reduce wear *in vivo*.

McKenney et al.[7] observed sub-surface damage on the occlusal surface of Class II composite resin restorations *in vivo*. They also noted that change in wear rates represents a certain state of sub-surface damage accumulation. Heavy occlusal forces immediately after insertion could produce sub-surface damage resulting in wear 12-14 months later. Comprehensive *in vivo* and *in vitro* studies must precede any confirmation of this hypothesis. Experimental composite resin restorations with increased wear resistance are being developed.[8] However, at present it seems reasonable to recommend that clinicians remove supra-occlusal stresses on composite resin restorations immediately after insertion to reduce the possibility of sub-surface damage.

Minimal cavity extensions[9,10] will also reduce the area of composite resin at risk to wear and damage. With the properties of silver amalgam and composite resins being different, it is logical to alter the cavity preparations according to the properties. In this study, standard preparations were used in a half-mouth study design, so that the two materials could better be compared. Further clinical trials are needed to evaluate the effect of minimal hard tissue removal on the durability of composite resin.

SUMMARY AND CONCLUSION

Three years after insertion, 90 Profile and 94 Dispersalloy restorations were clinically evaluated. Eighty per cent of the Dispersalloy restorations were clinically sound, compared to 46 per cent of those restored with Profile. The main factor in the failure of Profile was occlusal wear, with or without staining. The margins of the Profile restorations were superior to the Dispersalloy restorations but eight had been or required replacing, compared to only four for Dispersalloy.

Under the terms of this study posterior teeth restored with Dispersalloy are superior to those restored with Profile.

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Reprint requests to Dr. Derkson.

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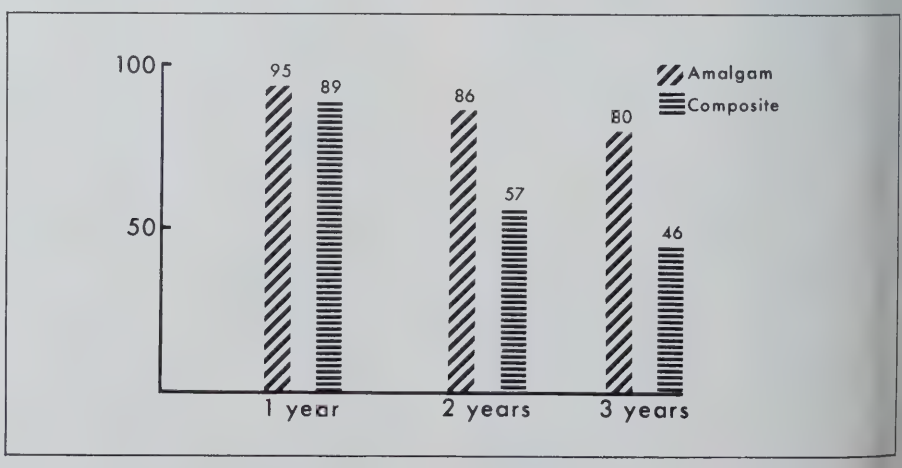

Fig. 1: *Comparison of composite resin and amalgam restorations that were sound at one, two and three year evaluation times.*

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MARGINAL LEAKAGE OF DENTAL AMALGAMS: EFFECT OF CAVITY VARNISH AND BURNISHING

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ABSTRACT

The effect of burnishing and cavity varnish on marginal leakage of four different commercial amalgams was studied using an in vitro air pressure technique. Amalgams were chosen according to their composition (low-copper vs high-copper), microstructure (ternary vs admixed) and particle shape (Lathe-Cut, Spherical and admixed). Results showed that both application of cavity varnish prior to amalgam insertion and burnishing of amalgam restorations following carving, significantly reduced marginal leakage. This effect was independent of the composition, microstructure and particle shape of the tested amalgams.

SOMMAIRE

En recourant à une technique pneumatique, on a étudié en laboratoire l'effet du brunissage et du vernis pour cavité sur le défaut d'étanchéité des bords de quatre amalgames commerciaux différents. Les amalgames ont été choisis d'après leur composition (basse teneur en cuivre vs haute teneur en cuivre), leur structure microscopique (ternaire vs mélangée) et leur forme particulière (taillés au tour, sphériques et mélangés). Les résultats ont démontré que l'application d'un vernis pour cavité avant d'insérer l'amalgame ainsi que le brunissage des restaurations à l'amalgame après le modelage réduisent considérablement les défauts d'étanchéité des bords. Ces résultats ont été obtenus indépendamment de la composition, de la structure microscopique et de la forme particulière des amalgames éprouvés.

REVIEW OF LITERATURE

Cavity varnish has been employed in restorative procedures as a pulp protecting agent since the late 19th century.[1,2] However, its beneficial effects on marginal leakage have been studied more recently.[3-7] Barber et al.,[6] using radioisotope technique, found improvement of marginal seal with cavity varnish and emphasized its use, especially in consideration of extensive leakage of newly placed amalgams. Yow and Sayegh[7] found that Copalite was helpful in reducing marginal leakage of high-copper amalgams, especially in the first month of the study; after this period, both unvarnished and varnished specimens showed a decreasing trend in marginal leakage.

Some investigators,[8-10] however, have expressed concern over the possibility of dissolution of cavity varnish in the oral environment, which in turn would result in the aggravation of marginal leakage. Smith et al.[8] found that a high-copper amalgam restoration treated with cavity varnish, when subjected to a corrosive regimen, showed a substantial amount of marginal leakage. They hypothesized that perhaps the cavity varnish had been dissolved in the Ringer's solution that they used in their study. Advokaat et al.[9] reported that after one year of clinical service, restorations with cavity varnish application had a higher degree of marginal breakdown than unvarnished specimens. Vasudev et al.[10] compared marginal leakage of varnished and unvarnished amalgam specimens using a real time quantitative method. They found that although varnished specimens initially leaked less than unvarnished specimens with time they showed a progressively high marginal leakage.

Burnishing and its effect on marginal seal and the overall integrity of amalgam restorations has been a point of controversy for a long time, with different points of view concerning the advantages or disadvantages of burnishing[11-21] Kato et al.[15] found a reduction in the amount of marginal leakage following burnishing. Chan et al.,[17] using scanning electron microscopy, reported that the gaps seen in the carved specimens were filled by an amorphous material in the burnished specimens. Cothren et al.[20] and Boyer and Torney[21] did not find any beneficial effect in marginal leakage reduction following burnishing. Matyas et al.,[18] on the other hand, found that although burnishing was most beneficial in obtaining a good marginal seal in the dry state, it resulted in the worst marginal seal when the specimens were corroded. They attributed this phenomenon to the excess mercury brought to the surface by burnishing.

The purpose of the present investigation was to shed some light on the role of these factors on marginal leakage as applied to both low-copper (lathe-cut and spherical) and high-copper (dispersed-phase and ternary) amalgams, using a quantitative air-pressure technique.

METHODS AND MATERIALS

The air-pressure technique used in this study has been described in detail in another report[22] Basically, the technique consisted of quantitative measurement of marginal

leakage using Argon gas. Plastic cylinders (4 mm × 4 mm) were used as molds and amalgam was packed in these cavities. Argon gas was forced through the amalgam mold interface under 60 psi pressure. The gas which could have leaked through was collected during a 15-minute period and was considered as an indicator of marginal leakage.

Four amalgams were used in this study. Two were of low copper content (Fine-Cut, Spherical) and two were high copper amalgams (Tytin and Dispersalloy). Amalgams were prepared according to the manufacturers' instructions (**Table I**).

Effect of Cavity Varnish on Marginal Leakage

In this part of the study, specimens were divided into three groups: those in group 1 received no cavity varnish; those in group 2 received one layer of varnish*, and specimens in group 3 received two layers of cavity varnish. The varnish was applied to the internal walls and the cavo-surface margin. The second layer was applied after the first layer had been dried by a blast of air. A fine camel hair brush was used for this purpose. Amalgams were hand-condensed and carved towards the cavo-surface margin with a No. 7 Ward Carver.+ Specimens were kept at 37±1°C in an incubator and were tested for marginal leakage after 24 hours. Six replications per each test condition for each alloy were prepared and tested — a total of 72 specimens.

Effect of Burnishing

The same four amalgams were also used in this part of the study.

Immediately after the specimens were carved, burnishing was performed using a ball burnisher† (2 mm in diameter). Cavity varnish was not employed in this part of the study. The direction of the burnisher was from the centre of the cavity to the cavo-surface margin. Burnishing continued until a glossy surface was obtained.

Specimens were kept at 37±1°C in an incubator and were tested for marginal leakage after 24 hours. Six replications for each alloy were prepared. Specimens in group 1 of the first part of this study, which were carved only, acted as control.

The data were treated statistically using a two-way analysis of variance and Scheffe's multiple comparison test at 95 per cent confidence interval.

RESULTS

Effect of Cavity Varnish

Table II shows the mean values for marginal leakage as affected by cavity varnish. Application of one or two layers of cavity varnish significantly reduced marginal leakage for all the alloys. Comparison of marginal leakage values in the vertical direction in the table shows that in the unvarnished condition, Fine-Cut leaked significantly more than other alloys. After application of one or two layers of cavity varnish, however, there was no significant difference among different amalgams.

Effect of Burnishing

Table III shows the mean values for marginal leakage of burnished and unburnished specimens. The results show a significant reduction in marginal leakage following burnishing for all of the amalgams. As mentioned previously, in the control group one of the amalgams showed a significantly higher marginal leakage. In the burnished condition, however, there were no significant differences among the amalgams.

DISCUSSION

The effect of cavity varnish

The reduction in the amount of marginal leakage following the application of one layer of cavity varnish is remarkable. This reduction is much more pronounced when two layers of varnish are applied, and these results add to the magnitude of other reports favoring the application of cavity varnish prior to amalgam insertion.[3-7]

In addition to its function of protecting the pulp from chemical irritation, cavity varnish also acts to reduce marginal leakage. This latter action has been likened to that of a gasket which occupies the space between the cavity wall and amalgam filling (**Fig. 1**). Cavity varnish will best serve this purpose

TABLE I

List of Alloys

ALLOY	DESCRIPTION	MANUFACTURER	MODE OF DISPENSING	HG/ALLOYS	TRITURATION TIME (SEC.)*
Tytin	High-Cu (uni-comp.)	S.S. White Philadelphia, PA 19102	Predispensed	43	10
Dispersalloy	High-Cu (admixed)	Johnson & Johnson E. Windsor, NJ 08520	Powder	50	20
Fine Cut	Low-Cu (irregular)	L.D. Caulk Co. Milford, Delaware 19963	Powder	50	12
Spherical	Low-Cu (spherical)	L.D. Caulk Co. Milford, Delaware 19963	Powder	45	10

*Capmaster amalgamator, S.S. White Dental Products, 3 Parkway, Philadelphia, PA 19102, U.S.A.

TABLE II

Marginal Leakage Argon Gas ml/15 min.+

ALLOY	NO VARNISH	1 VARNISH	2 VARNISH
Spherical	95 (8.1)	19 (1.7)	1 (.45)
Tytin	117 (10.8)	22 (2.4)	1.4 (.38)
Dispersalloy	149 (9.9)	28 (2.3)	1.1 (.58)
Fine-Cut	371 (62)	42 (3)	1.5 (.45)

+ Mean of six replications with standard deviations in parenthesis.

Vertical lines connect those alloys that do not differ statistically.

TABLE III

Marginal Leakage Argon Gas ml/15 min.+

ALLOY	CARVED ONLY	CARVED AND BURNISHED*
Spherical	95 (8.1)	22 (1.5)
Tytin	117 (10.8)	27 (2.3)
Dispersalloy	149 (9.9)	27 (3)
Fine Cut	371 (62)	28 (3.4)

+Mean of six replications with standard deviations in parenthesis.

* Statistically different at $p < .05$.

Vertical lines connect those alloys that do not differ statistically.

*Copalite, Harry J. Bosworth, New Jersey.

+American Dental Manufacturing Co., Montana.

†American Dental Manufacturing Co., Montana.

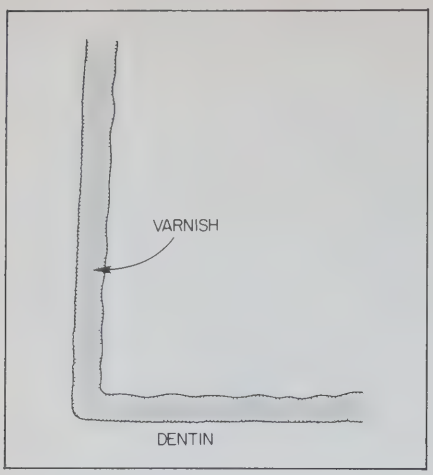

Fig. 1. *Schematic drawing of the cross-section of a cavity prepared for amalgam. Cavity varnish is seen lining the cavity wall.*

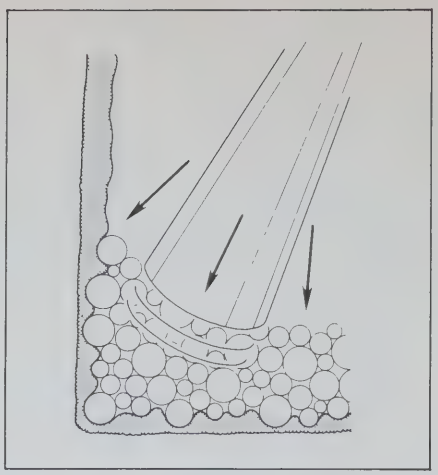

Fig. 2. *Correct manner of condensation. Lateral and vertical thrusts help push the amalgam particles into the layer of cavity varnish and reduce the marginal gap.*

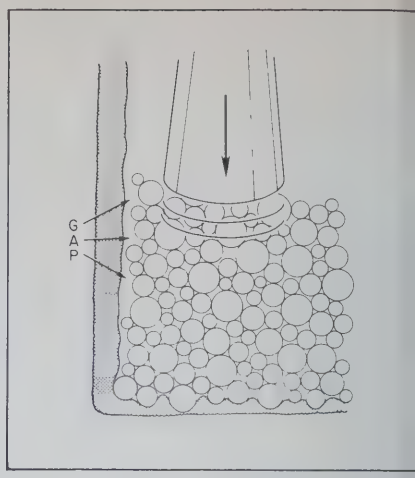

Fig. 3. *Vertical condensation only does no provide optimal adaptation. Gaps can remain along the interface between amalgam and cavity varnish.*

where lateral condensation thrusts push amalgam particles into the cavity varnish lining and consequently to the cavity wall (**Fig. 2**). Failure to do so will result in the presence of gaps and voids in the interface between amalgam and varnish (**Fig. 3**). Such an action is probably more pronounced with spherical amalgams than with the lathe-cut amalgams.

However, some doubts have been expressed as to the possible dissolution of cavity varnish in the oral environment, which may result in detrimental effects on marginal seal. The present study did not attempt to test the long-term performance of cavity varnish in a simulated oral environment and thus does not provide any support for this. However, today's cavity varnishes are manufactured with different chemical compositions; some use a natural gum, while others use a synthetic. The type of solvent may also be different.

In view of possible differences in solubility resistance of these cavity varnishes, a long-term study of solubility under controlled conditions is warranted.

The Effect of Burnishing

In this study, the reduction in the amount of marginal leakage following burnishing is in agreement with the findings of Kato et al.[15] and Chan et al.,[17] while the results from Cothren et al[20] and Boyer et al[21] do not agree with those of the present investigation. Although several factors may have contributed to such disagreement, differences in the technique of marginal leakage measurement or the use of teeth instead of plastic molds may be responsible for the different results.

One of the reports considered burnishing to be responsible for excess mercury in the surface, therefore causing a poor marginal seal.[18] Although such argument may be appropriate for the old generation of amalgams, or even existing lathe-cut amalgams, it does not apply to new amalgams especially those in the form of spherical particles. These amalgams consist of fine particles and because of the mode of production, have clean surfaces which are free from cracks (**Figs. 4, 5** and **6**). It is known that mercury will not react with dirty or oxidized surfaces of amalgam powder. In the case of lathe-cut amalgams, a large amount of mercury is needed to initiate amalgamation. So at the end of the amalgamation process, some extra unreacted mercury will be trapped in the cracks of the original alloy particle and may be brought up to the surface by the action of the burnisher. As mentioned previously, spherical particle amalgams do not suffer from such defects. Their mercury-to-alloy ratio is much less than that of lathe-cut amalgams (approx. 43 per cent vs. approx. 50 per cent), their alloy particles are free from any cracks and there is virtually no extra free mercury present to be brought up to the surface by burnishing.

CONCLUSIONS

The results of the present investigation emphasize the significance of certain clinical considerations to be observed by the practitioner.

Application of cavity varnish prior to amalgam insertion, proper condensation technique, and also burnishing of amalgam restorations following carving, among other advantages, help reduce marginal leakage. Otherwise, patient discomfort in the form of postoperative hypersensitivity, especially in the initial period after restoration, is likely. Also, the more serious complication of recurrent caries should not be overlooked.

The following conclusions are derived from the present study:

1. Application of cavity varnish substantially reduced marginal leakage of lo copper and high copper amalgam Two layers of cavity varnish were mo effective than one layer.
2. There were no significant differenc in the marginal leakage of differe amalgams when cavity varnish w used.
3. Burnishing of amalgam specime following carving significantly reduc marginal leakage.
4. There were no significant differenc in the marginal leakage of differe amalgams in the burnished specimen

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Reprint requests to Dr. Asgar.

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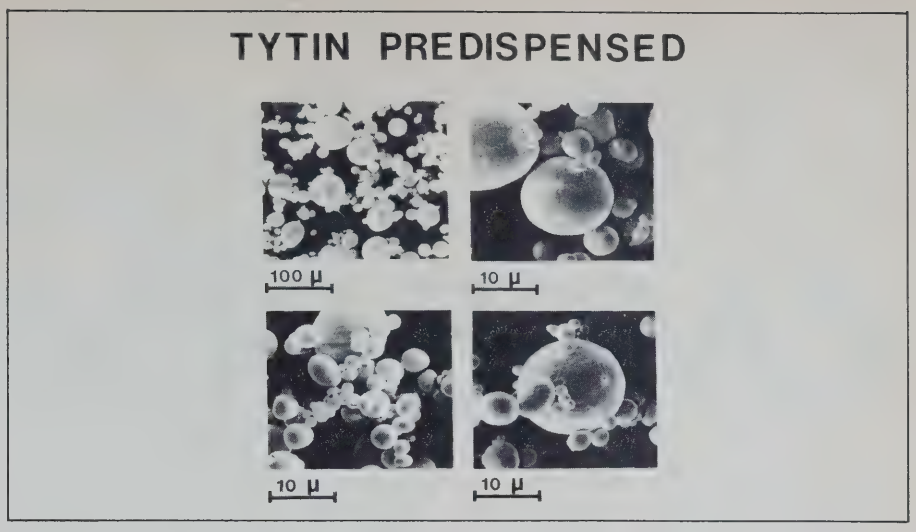

Fig. 4. *Particles of a spherical amalgam powder as seen with scanning electron microscopy. Note the spongy texture of the particles. Particles vary in size from to 1 to 45 μ.*

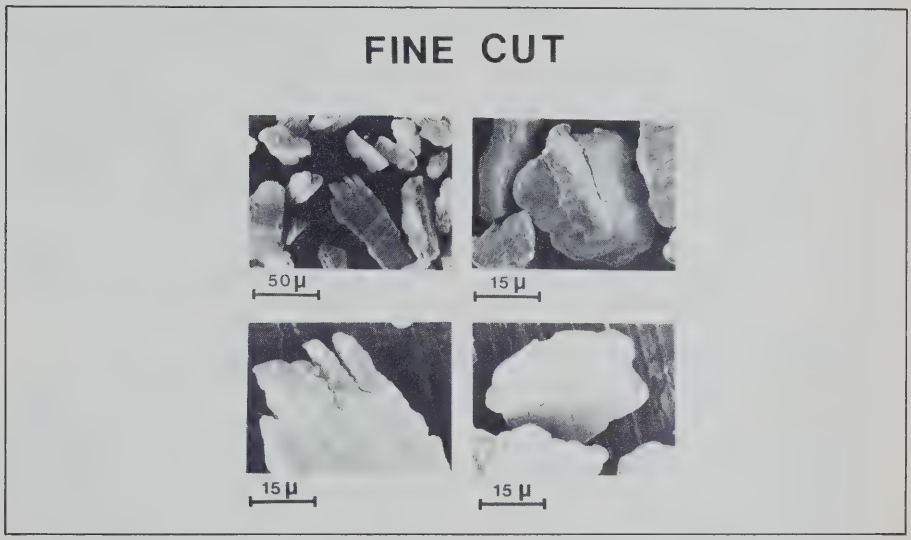

Fig. 5. *Particles of a lathe-cut amalgam powder as seen with scanning electron microscopy. They vary in size from 20 to 250 μ. and are frequently visible up to 15-20 μ long and 1 μ wide.*

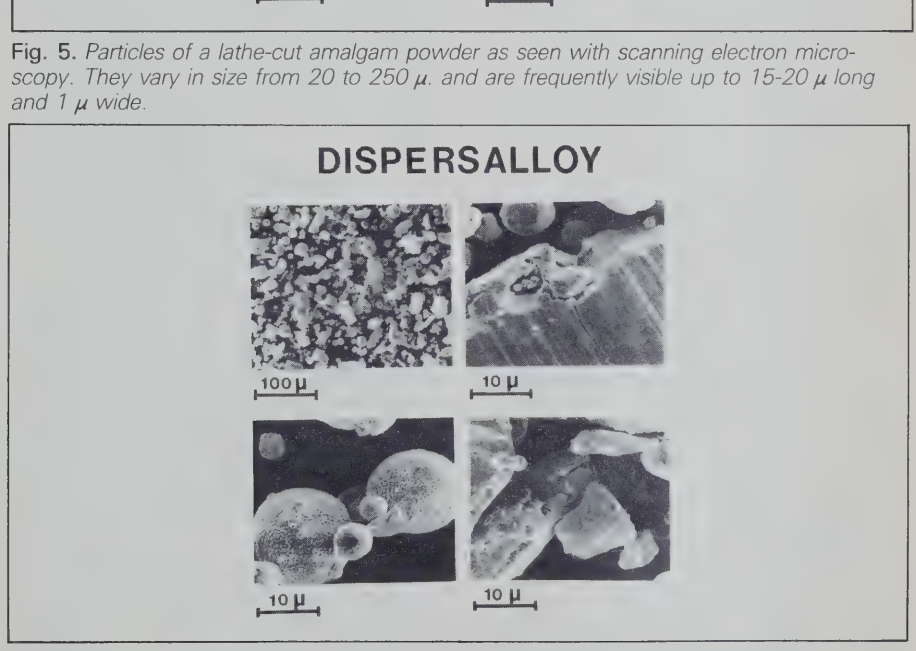

Fig. 6. *Particles of an admixed type amalgam powder as seen with scanning electron microscopy. Powder consists of both spherical and lathe-cut particles. Cracks are visible on the lathe-cut particles.*

PRÉVALENCE ET ÉVOLUTION DE FACTEURS DE RISQUES POSSIBLE POUR LA CARIE DENTAIRE

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ABSTRACT

A cohort of 2037 elementary school children from Montreal provides data on possible risk factors for dental caries. They suggest in general an unsatisfactory health behavior, that is, as compared to teachings in this matter. Principal findings are: 79 per cent of children do not take fluoride regularly, 50 per cent brush irregularly or never, dental floss is almost never used, 20 per cent do not visit the dentist annually, 65 per cent snack before bed and a third of the snacks are possibly cariogenic, 24 per cent have soft drinks each day and 18 per cent, candies and chocolate. Mean plaque index suggests mediocre dental hygiene. For the group as a whole repeated data on risk factors are consistent. Analysed for each individual, consistency is at best moderate. Our traditional measures of behavioral risk factors for children must be reassessed.

RÉSUMÉ

À partir des données d'une étude longitudinale chez une cohorte de 2037 enfants montréalais de niveau scolaire élémentaire, des données sur les facteurs de risque possible à l'égard de la carie sont présentées. Elles suggèrent qu'en général le comportement sanitaire est loin d'être conforme à l'enseignement préventif véhiculé à cet égard. Ainsi on trouve principalement les éléments suivants: 79 pour cent des enfants ne consomment pas régulièrement du fluor, 50 pour cent brossent irrégulièrement ou jamais leurs dents, la soie dentaire n'est à peu près pas utilisée, 20 pour cent ne visitent pas le dentiste annuellement, 65 pour cent collationnent au coucher et le tiers de ces collations seraient cariogènes, 24 pour cent consomment des boissons gazeuses chaque jour et 18 pour cent des bonbons ou du chocolat. L'indice moyen de plaque suggère une hygiène dentaire médiocre. Dans l'ensemble les données répétées sur les facteurs de risque sont consistantes. Analysées pour chaque individu, la consistance est au mieux modérée. Cela suggère qu'il faut repenser la mesure des facteurs de risque comportementaux chez les enfants.

INTRODUCTION

Zimmerman[1], Kortz[2] et Grainger[3] ont suggéré des listes de variables pouvant être considérées prédictives de la carie dentaire. Pour une prédiction optimale de la carie, toutes ces variables seraient inclues, mesurées sans erreur, et selon un modèle définissant quelle composante de quelle variable est reliée aux autres et comment. Un tel modèle n'existe pas à ce jour. C'est pourquoi aucune étude ne peut prétendre en arriver à prédire de façon satisfaisante la carie dentaire. À défaut de cette situation optimale, reconnaissons que plusieurs études épidémiologiques sur la carie dentaire ont recueilli des données sur des facteurs de risque potentiels, mais la plupart d'entre elles en ont considéré un nombre très limité. De plus, parmi les études où des données ont été collectées sur plusieurs facteurs de risque, seulement quelques-unes[4-7] ont suffisamment décrit la prévalence de ces facteurs et une seule étude[8] les a mesurés deux fois. Cette information descriptive peut à elle seule suggérer des actions sanitaires très pertinentes, surtout pour le milieu spécifique d'où les données originent. À partir d'une étude longitudinale où nous avons étudié la relation entre des facteurs de risque et la carie dentaire chez un groupe d'enfants d'âge scolaire élémentaire, cette information est disponible.

Dans cet article nous présentons un tableau du comportement des enfants vis-à-vis les principaux facteurs de risque, nous discutons les implications de recherche soulevées par la double mesure sur les facteurs et nous dégageons quelques éléments d'action sanitaire qui s'imposent.

MÉTHODES

L'étude a été décrite en détail ailleurs[9]. Elle a débuté en 1978 avec un échantillon systématique de 2,037 enfants. Le cadre d'échantillonnage est constitué de tous les enfants fréquentant toutes les écoles publiques de Montréal. La taille de l'échantillon fut estimée selon une méthodologie conventionnelle pour les études descriptives inférentielles[10] en ajustant pour avoir la précision voulue au niveau de chaque cellule d'analyse et en tenant compte d'un taux de perte de sujets en cours d'étude. Chaque année des dentistes sont entraînés avant l'examen sur le terrain; l'examen se déroule à l'école sans autre instrumentation qu'un mirroir et un explorateur. L'indice cao CAO dent est mesuré selon des critères précis.

Au moment de l'examen certaines questions sur les habitudes d'hygiène sont posées à l'enfant et la condition d'hygiène est déterminée selon la méthode de Greene et Vermillion[11], mais la plupart de l'information sur les facteurs de risque est obtenue par un questionnaire aux parents. Ce questionnaire contient des éléments sur les facteurs socio-démographiques, la consommation de fluor (gouttes, vitamines, type de pâte dentifrice, consommation nominale de fluor dans l'eau pour chaque année depuis la naissance), les habitudes d'hygiène (brossage (fréquence et moment), soie dentaire), l'utilisation de soins dentaires (fré-

quence et types d'intervention), les facteurs familiaux indirects (prothèses, abcès), et la consommation alimentaire. Celle-ci est déterminée par un questionnaire de fréquence. Ainsi pour un groupe d'aliments donnés (exemple: viande – poulet – poisson) il fallait déterminer si l'enfant en mange moins d'une fois semaine, pas tous les jours mais au moins une fois semaine, ou chaque jour ou presque. Le questionnaire a été prétesté en 1977 pour la compréhension des termes et la capacité pour les parents de répondre à toutes les questions. Nous en sommes actuellement à compléter le sixième examen dentaire annuel sur les mêmes sujets. Durant cette période les parents ont été sollicités trois fois pour répondre au questionnaire, soit les deuxième (1979), troisième (1980) et quatrième (1981) années de l'étude. Nous rapporterons des données sur les collectes de 1979 et 1980. En 1979, 88.9 pour cent des parents ont répondu au questionnaire et en 1980, 84.7 pour cent. Ainsi quand on rapporte des données provenant de celui-ci, elles proviennent des 1,485 sujets en 1979 et des 1,298 en 1980. Par contre quand les données sont recueillies au moment de l'examen dentaire elles se rapportent en 1978 à 2,037 sujets, en 1979 à 1,669 et en 1980 à 1,532. Les sujets perdus à l'étude et ceux qui y sont demeurés mais n'ont pas répondu au questionnaire ne présentent pas de particularités telles qu'on puisse les identifier comme des sous-groupes différents de l'ensemble de la cohorte.

Pour étudier l'évolution des facteurs de risque nous avons considéré deux concepts. D'abord, la concordance ou la consistance telle qu'évaluée par la statistique Kappa (K)[12]. Ce que nous vérifions ici c'est la possibilité d'utiliser indifféremment l'un ou l'autre questionnaire pour la prédiction de la carie à partir des données de chaque individu en tant que tel. Bien que l'analyse de prédiction ne sera pas décrite dans cet article, la discussion sur la concordance a sa pertinence ici pour faire ressortir le problème de la mesure des facteurs de risque particulièrement de nature comportementale. Landis et Koch[13] ont suggéré une interprétation de la statistique Kappa qui peut varier de −1 à +1; ainsi une valeur de plus que .75 représente une excellente concordance au delà de la chance, et une valeur de moins de .40 une concordance pauvre. On peut ainsi tester la signification statistique de K posant l'hypothèse nulle que K = 0. L'autre concept étudié est la tendance. Cela est fait via le Tau b de Kendall (τb) et le gamma (γ)[14]. Ces deux statistiques bien que différentes dans leur dénominateur s'interprèteraient comme suit: il s'agit de la proportion par laquelle l'erreur est réduite en utilisant les premières données pour prédire les deuxièmes. Cela s'apparente à l'interprétation du coefficient de corrélation de Pearson. Une statistique positive indique que le nombre de paires de réponses concordantes prédominent (eg. γ = .40, il y a 40 pour cent plus d'accord que de désaccord entre les réponses aux deux énoncés). Une statistique négative indique qu'un nombre de paires discordantes prédomine.

RÉSULTATS

1. Fluor

Il n'y a que 18 enfants qui ont été exposés au fluor dans l'eau au moins une année et cela fut entre 0 et 1 an ou entre 1 et 2 ans. En 1979, on a interrogé les parents sur la consommation de fluor en gouttes ou en vitamines en aucun temps depuis la naissance: elle aurait eu lieu chez la moitié des sujets. Toutefois elle fut de courte durée: la plus grande proportion de sujets parmi ceux qui en ont consommé, c'est-à-dire 14 pour cent, l'ont fait pendant 1 à 2 ans seulement. Pour l'année 1980, 21 pour cent ont admis une consommation régulière. La cohorte a une moyenne d'âge de 9.3 ans à ce moment. 83 pour cent des enfants utilisent une pâte dentifrice fluorurée.

2. Habitudes de brossage

Au **tableau I** les enfants eux-mêmes ont révélé leurs habitudes de brossage. Il suffira de retenir qu'autour de 50 pour cent, selon les années, brossent irrégulièrement ou ne brossent jamais leurs dents. En vieillissant moins d'enfants ne brossent jamais leurs dents.

Lorsque les parents ont répondu pour leurs enfants à propos du brossage, les données sont un peu différentes. En effet ceux-ci rapportent plutôt que le quart environ des enfants brossent irrégulièrement ou ne brossent jamais leurs dents. Mais dans des analyses ultérieures de prédiction par la régression multiple, il s'est avéré que les données fournies par les enfants à cette question étaient contributives tandis que celles des parents ne l'étaient pas. On peut donc être porté à croire que ce que les enfants disent à l'égard de leurs habitudes de brossage représente plus la réalité.

La moitié des parents (52 pour cent) aidaient les enfants à se brosser les dents lorsque ceux-ci avait 8 ans environ. Le brossage s'effectue surtout au coucher (61 pour cent) et après le déjeuner (46 pour cent).

Les parents et les enfants rapportent des données identiques sur l'utilisation de la soie dentaire. En effet, très peu l'utilisent mais l'usage semble croître avec l'âge. À 7 ans, 6.7 pour cent l'utilisent irrégulièrement ou une fois par jour; à 8 ans, 12 pour cent et à 9 ans, 24 pour cent. Toutefois seulement de 1 à 2 pour cent parmi ceux-là en font un usage quotidien.

3. Utilisation des soins dentaires

En 1979, nous avons demandé aux parents combien de visites chez le dentiste avaient eu lieu depuis la naissance de leur enfant (7 ans en moyenne). Vingt deux (22) pour ceux n'avaient jamais visité le dentiste; 45 pour cent l'avaient fait de 1 à 3 fois et 27 pour cent 4 fois ou plus. (6 pour cent n'ont pas répondu à cette question). Durant l'année 1980, 16 pour cent n'ont pas visité le dentiste, 65 pour cent l'ont visité de 1 à 3 fois et 14 pour cent 4 fois ou plus (5 pour cent n'ont pas répondu). L'examen avec application de fluor (55 pour cent) et les obturations (53 pour cent) sont les types

TABLEAU 1

Brossage selon l'enfant
(Nombre et pourcent)

	1978	1979*	1980
Jamais	222 (10.9)	101 (6.1)	51 (3.3)
Irrégulier	899 (44.1)	726 (43.5)	762 (49.7)
Une fois die	520 (25.5)	380 (22.8)	267 (17.4)
>1 fois die	396 (19.4)	455 (27.3)	452 (29.5)
Total	2037	1669	1532

* 7 inconnu

TABLEAU II

Condition d'hygiène. Plaque.

		1978	1979	1980
INDICE MOYEN		1.22	1.45	1.17
ÉCART-TYPE		.76	.83	.79
	0	167 (8.2)	70 (4.2)	158 (10.3)
Indice ordinal	.001 – .5	248 (12.2)	165 (9.9)	199 (13.0)
(Nombre et pourcent)	.501 – 1.	614 (30.1)	480 (28.8)	542 (35.4)
	>1.	1008 (49.5)	954 (57.2)	633 (41.3)
Total		2037	1669	1532

d'interventions les plus fréquentes auprès des enfants.

4. Facteurs familiaux

Quarante deux pour cent (42 pour cent) des pères, 51 pour cent des mères et 9 pour cent des frères et soeurs portent des prothèses. Ces prothèses sont complètes chez 20 pour cent des pères et 25 pour cent des mères. On a aussi demandé si la famille avait connu des problèmes d'abcès dentaires et 45 pour cent des familles ont reconnu avoir fait une telle expérience.

5. Alimentation

En terme de fréquence et périodicité de l'alimentation nous nous sommes attardés surtout aux collations. Ainsi 90 pour cent des enfants en prennent de 1 à 3 par jour et la plupart des autres, quatre ou plus. Environ 65 pour cent des enfants, en moyenne pour les années, collationnent au coucher. Quant à la nature de ces collations on peut dire que trois fois sur cinq, à d'autres moments qu'au coucher, il y a au moins une des denrées suivantes qui est consommée soit: bonbons, chocolat, boissons gazeuses, biscuits, gâteaux, beignes. Au coucher, une collation sur trois inclut au moins un de ces aliments.

Les principaux éléments qui se dégagent sur la fréquence de consommation des aliments sont les suivants: parmi les aliments qu'on n'étiquette pas habituellement comme étant cariogènes, certains sont consommés par la majorité, à chaque jour ou presque (viande, pains-céréales et pommes de terre, légumes et fruits), d'autres sont consommés par la majorité, quelquefois par semaine (fromage-yogourt, oeufs, pâtes alimentaires). Parmi les aliments généralement classifiés cariogènes, la consommation de boissons gazeuses est la plus élevée: près de 25 pour cent en boivent chaque jour ou presque. 18 pour cent font une telle consommation pour le chocolat et les bonbons, 17 pour cent pour la gomme à mâcher et les pastilles et 38 pour cent pour les biscuits, gâteaux, beignes et tartes.

6. Condition d'hygiène

Au **tableau II**, les résultats obtenus sur la condition d'hygiène sont décrits. On n'y décèle pas une tendance claire. Toutefois si on considère qu'un indice au delà de 1 dénote une condition franchement médiocre la moyenne est toujours supérieure à cette valeur. De plus le minimum d'enfants qu'on trouve dans cette catégorie d'hygiène médiocre est de 41 pour cent.

Au **tableau III** on trouve un résumé des faits saillants qui viennent d'être décrits.

7. Évolution des facteurs de risque

Pour l'ensemble du groupe les données sont concordantes d'une année à l'autre. Mais la question se pose au niveau des individus puisque c'est en tant que tels qu'ils sont considérés dans l'analyse de la relation avec la carie. On a donc voulu étudier la concordance entre les données, c'est-à-dire voir si les réponses pour un enfant une année sont consistantes avec les réponses fournies l'année suivante. À cet effet le kappa, bien que toujours statistiquement significatif, varie dans sa valeur numérique entre .15 et .56 quand il est calculé pour vingt questions. Revenant aux critères de jugement sur cette valeur on conviendra que la consistance des données d'un individu par rapport à lui-même est au mieux modérée.

Les statistiques de tendance sont toujours positives pour ces 20 questions, indiquant donc, par exemple, que le plus l'enfant brossait une année, le plus il brosse l'autre année (et l'inverse) ou, qu'il y a toujours plus d'accord entre les réponses que de désaccord. Les valeurs de gamma varient entre +.25 et +.72, indiquant le plus souvent une tendance positive modeste.

En résumé, le regard sur la concordance et la tendance ne suggère pas des habitudes très stables ou très prévisibles d'une année à l'autre, du moins telles que rapportées.

DISCUSSION

Il n'y a aucune donnée de ce genre sur la population étudiée et notre but en les proposant pour la première fois n'est pas de faire des comparaisons avec d'autres échantillons. En effet aucune publication revisée n'a fait état d'une telle collecte d'informations. Alors il faudrait recueillir ici et là sur des groupes non homogènes des éléments comparatifs. Il est incertain que cet exercice porte fruit d'autant que chaque investigateur a (malheureusement) sa propre façon de poser les questions. Plutôt, en même temps que de fournir des données descriptives, en elles-mêmes très utiles, nous voudrions proposer une réflexion globale sur le comportement de la population.

Il est difficile de croire que le sombre tableau dépeint au niveau des résultats soit celui d'enfants d'une grande ville nord-américaine durant les années 80. On pourrait se contenter de dire que ces enfants sont en bonne proportion (environ 40 pour cent) de milieu modeste et arrêter là toute la discussion. Mais il faut aller plus loin. Depuis de très nombreuses années, il se fait dans les écoles publiques de Montréal une éducation sanitaire via les dentistes de santé publique, les infirmières, les hygiénistes dentaires, les nutritionnistes et les professeurs. Sans compter la promotion des associations dentaires professionnelles, des compagnies fabriquant brosses à dent et pâtes dentifrices, des représentants des producteurs laitiers, etc. . . De plus, le Ministère des Affaires Sociales, depuis quelques années, a financé des campagnes publicitaires télévisées ou écrites de promotion de la santé. Et bien qu'on ne connaisse pas l'utilisation des services dentaires avant le Régime d'assurance-maladie, on sait que depuis son instauration, la participation annuelle augmente[15] et on devrait assumer qu'il se fait en bureau privé de l'éducation sanitaire. Malgré toutes ces instances et malgré les coûts importants de ces interventions, le comportement des enfants est loin d'être conforme aux recommandations. En aucune façon pouvons-nous évaluer l'impact des mesures spécifiques. Notre étude n'est pas une étude évaluative. Mais chose certaine, quels qu'aient été les enseignements sanitaires à ce jour, ils n'ont pas fait que les enfants aient suffisamment adopté de bonnes habitudes. Étant donné les composantes familiales (prothèses chez la moitié des parents avec près de 70 pour cent les ayant eues avant 30 ans), il faudrait probablement songer à des moyens qui influenceraient directement les parents. Il existe peut-être une composante génétique chez les canadiens-français (ils sont surtout les porteurs de prothèses) qu'il serait nécessaire d'étudier mais

TABLEAU III

Facteurs de risque — Faits saillants

FLUOR EN COMPRIMÉS	: 79% pas de consommation régulière.
BROSSAGE	: 50% brossent irrégulièrement ou jamais.
SOIE DENTAIRE	: 98% ne l'utilisent pas régulièrement.
SOINS DENTAIRES	: Environ 20% ne visitent pas le dentiste annuellement.
FACTEURS FAMILIAUX	: 40% des pères et 50% des mères portent des prothèses.
ALIMENTATION	: Environ 65% collationnent au coucher et le tiers de ces collations seraient cariogènes. 60% des collations du jour contiennent au moins un aliment cariogène. Consommation quotidienne: boissons gazeuses (24%), bonbons-chocolat (18%), gomme-pastilles (17%).
PLAQUE	: Indice moyen dénote une condition médiocre.

la composante environnementale (facteurs de risque personnels et absence de fluoruration) étant ce qu'elle est, ne peut pas ne pas compter. Un site privilégié pour l'éducation sanitaire parents-enfants est le bureau du dentiste. Malheureusement, il se peut que les plus grands utilisateurs soient ceux qui possiblement en aient le moins besoin. Une approche intégrée santé communautaire (école — domicile (via les visites des infirmières) — cours prénatals (aux mères enceintes)) et pratique "privée" (bureau de dentiste) devrait être proposée. Les ressources sont probablement toutes présentes (à Montréal en tout cas) mais il faudrait, en parallèle, tenter des activités d'intervention innovatrices à efficacité démontrée, mener des études pour trouver les meilleurs moyens d'intervention et des études sur l'efficacité de ces moyens d'intervention.

Le fait que les données répétées sur les facteurs de risque aient toutes des coefficients de corrélation positifs mais faibles signifient que les comportements ne sont que relativement prévisibles dans le même sens d'une année à l'autre. De plus, on l'a constaté, il serait difficile de substituer les données d'une année pour l'autre, la statistique de concordance kappa l'indiquant. Le tableau des facteurs de risque a été dessiné pour le groupe dans son ensemble, il n'y a aucun changement dramatique d'une année vis-à-vis de l'autre. Mais ce que les statistiques plus haut indiquent, c'est que si le tableau d'ensemble a l'air consistant (ex.: 18 pour cent des enfants une année font ceci et 20 pour cent l'autre année), c'est que certains individus ont nouvellement adopté le comportement et d'autres l'ont abandonné, les uns et les autres au profit d'un meilleur ou d'un moins bon. Les raisons qu'on peut évoquer pour ces constatations sont: 1) qu'effectivement les comportements changent, 2) que le questionnaire dans une certaine mesure ne permet pas une grande fiabilité ou une grande reprod isibilité, 3) que les individus eux-mêmes, r algré une constance dans le comportement et un questionnaire bien compris, changent leur façon de répondre, influencés ou non par la participation à une étude.

S'il est possible que certains changements mesurés au niveau des facteurs de risque soient réels et aient un impact biologique même sur une courte période ne devrait-on pas tenter à l'avenir dans les études de répéter les mesures sur les facteurs de risque? Barkla et coll.[16] ont soulevé l'hypothèse que le risque n'est pas constant parmi les individus de susceptibilité différente. Parmi les enfants surtout il serait tout à fait possible d'imaginer que les comportements varient sur de courtes périodes. Toujours en assumant que les changements sont réels, si on ne les mesure qu'une seule fois, il peut être très difficile d'associer carie et comportements, ou on peut découvrir des associations étonnantes. On peut arriver à cette période où l'enfant convaincu par quelque publicité bien faite décide de se brosser les dents régulièrement; s'il a été pendant des mois avant sans le faire et si l'effet de ce changement n'a pas produit de résultats on trouvera, comme certains auteurs, des associations négatives. Est-ce que malgré des changements réels et pouvant avoir un impact, on revient à des habitudes de base, est-ce qu'on garde une tendance positive de fond? Il faudrait probablement trouver le moyen de profiler le comportement de l'enfant de cet âge sur une assez longue période et l'étudier en rapport avec les changements dans la carie. Si on a des raisons biologiques de croire que les comportements mesurés ont une relation avec la carie et qu'en rapport avec leurs changements on trouve des changements dans la carie alors il resterait à savoir pour les facteurs qui ne s'avèrent pas avoir d'impact, si on a fait des erreurs de mesure ou si les changements sont sans importance. Si tant est que cela soit important à préciser dans certains contextes.

On ne s'est pas beaucoup penché sur les modalités optimales de cueillette d'information sur les facteurs de risque en santé dentaire surtout quand l'enfant est jeune et qu'il faut s'adresser aux parents.

En conclusion, on soulignera que l'écart suggéré par les données entre le comportement sanitaire enseigné et celui qui est vécu par les enfants à Montréal incite à réfléchir sur les modalités d'éducation sanitaire pratiquée à tous les niveaux. En attendant d'avoir des preuves scientifiques très solides quant à la nature et l'ampleur de l'effet de ces facteurs sur la carie, il est difficile de demeurer indifférent. Le dentiste clinicien qui traite l'enfant demeure sans contredit l'intervenant de premier plan pour appliquer ou faire appliquer par son équipe les techniques démontrées efficaces de modification de comportement auprès de son patient et des parents de cet enfant. Si on comprend facilement qu'il ne peut lui-même développer ces techniques et évaluer leur impact de façon scientifique, il peut faire siennes les connaissances dans ce domaine et les intégrer à sa pratique. Cela n'enlève en rien aux autres intervenants leur responsabilité propre qui va des études épidémiologiques et évaluatives jusqu'à la mise sur pied de programmes communautaires.

On retiendra aussi que les données répétées sur les facteurs de risques ont suggéré que l'approche épidémiologique traditionnelle du questionnaire, le plus souvent unique, sur les facteurs de risque des enfants en santé dentaire doit être repensée. Cette remarque est particulièrement plausible lorsqu'il s'agit de comportements à mesurer dans une population d'enfants.

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June 19-22: The 6th International Conference on Periodontal Research, Kibbutz Shefaim, Israel. Contact: The Sixth International Conference on Periodontal Research, P.O. Box 394, Tel Aviv, 61003, Israel.

June 21-24: The International Congress of Oral Implantologists World Congress VII for Oral Implantology, Munich, West Germany. Munich Sheraton Hotel. Contact: Clifford J. Kirschner, Executive Director, The International Congress of Oral Implantologists, P.O. Box 2277, Grand Central Station, New York, New York, 10163, 201-783-6300.

June 22-23: Third Annual Symposium for Sports Dentistry, Boyne Highlands Resort, northern Lower Michigan. Contact: Dr. W. C. Godwin, Dept. of Complete Denture Prosthodontics, University of Michigan Dental School, Ann Arbor, Michigan, USA 48109.

June 23-25: Florida Dental Association 1984 Florida Dental Congress. Buena Vista Palace, Lake Buena Vista, Orlando, Florida. Contact: Florida Dental Association, 3021 Swann Ave., Tampa Florida, 33609. 813-877-7597.

June 23-28: Yukon Dental Association presents Summer 84, continuing education seminar and escape. Combines lectures with a hike along the Chilkoot Trail. Contact: Dr. Frances Almstrom, 406 Lambert St., Whitehorse, Yukon, Y1A 1Z7, phone: 403-667-4486.

June 24-27: Canada Safety Council 16th Annual Safety Conference, Skyline and Delta Hotels, Ottawa, Ontario. Contact: The Canada Safety Council, 1765 St. Laurent Blvd., Ottawa, Ont. K1G 3V4, 613-521-6881.

JULY/JUILLET

July 1-6: Ninth Annual Congress of Dietetics, Toronto, Ontario. Hilton Harbour Castle Hotel. Continuing education credits will be assessed for both ADA and CDA registered dieticians. Contact: Congress Canada, Suite 603, 250 University Avenue, Toronto, Ont., 416-591-1498.

July 6-8: International Congress of Chinese Medicine, Airport Hilton Hotel, Los Angeles, California. Some dental procedures will be covered. Contact: Centre for Chinese Medicine, 230 Garfield Ave., Suite 202, Monterey Park, California, USA 91754.

AUGUST/AOÛT

August 12-17: The New Zealand Dental Association is holding its biennial conference, Auckland, New Zealand. Contact: Dr. N. P. Ewart, Conference Secretary, P.O. Box 28085, Auckland 5, New Zealand.

August 13-23: International Association of Dental Students Congress, Israel. For information, contact either: Mr. Annibale Coia, 12 Market Place, Carluke, Lanarkshire, M18, 4BP, Scotland or Congress Committee, Melia, P.O.B. 3109, 17 Gordon St., Tel-Aviv, Israel.

August 18-24: Canadian Society of Forensic Science 31st annual conference. Viscount Gort Flag Inn, Winnipeg, Manitoba. Contact: Executive Secretary, 613-235-7112 or write: Canadian Society of Forensic Science, 171 Nepean St., Suite 303, Ottawa, Ontario, K2P 0B4.

August 23-25: New Orleans Dental Conference, New Orleans, Louisiana, at the New Orleans Hilton Hotel. Part of the Louisiana World Exposition. Top clinicians are slated to take part. Contact: New Orleans Dental Conference, Suite 119, 3101 West Napoleon Ave., Metairie, LA., 70001, 504-834-6449.

August 25-31: 72nd Annual World Dental Congress of the FDI, Helsinki, Finland. Contact: FDI '84, Helsinki 8, SF 00100, Helsinki, 10, Finland.

SEPTEMBER/SEPTEMBRE

September 4-7: 7th Congress of the International Association of Dentistry for the Handicapped. Amsterdam, Holland. Contact: Mrs. Hongkie Tan, Brouwergracht, 210B, 1013 HD, Amsterdam, Netherlands.

September 6-9: American Association of Hospital Dentists, XXIV annual meeting. New Orleans, Louisiana. Contact: Dr. Joseph Cuminale, Louisiana State University School of Dentistry, Dept. of General Dentistry, Box 127, 1100 Florida Avenue, New Orleans, Louisiana, U.S.A. 70119.

September 9-15: McKay Sub-Branch of the Australian Dental Association will be hosting the North Queensland Dental Convention on Hayman Island. Contact: The Secretary, North Queensland Dental Convention, P.O. Box 838, MacKay, 4740, Australia.

September 14-16: The Canadian Academy of Endodontics twentieth annual meeting. Chateau Lake Louise, Lake Louise, Alberta. Contact: Dr. Carl Hawrish, 762-10830 Jasper Ave., Edmonton, Alta., T5J 2B3, 403-425-8930.

September 19-22: The American Academy of Periodontology annual meeting, Hilton Hotel, New Orleans, Louisiana. Contact: The American Academy of Periodontology, 211 E. Chicago Ave., Room 924, Chicago, Ill. 60611.

September 22-30: Academy of General Dentistry 1984 foreign conference. Interlaken, Switzerland. Contact: Van Dyck Travel, c/o AGD Travel Desk, 478 Golf Mill Rd., Niles, Illinois, USA 60648.

OCTOBER/OCTOBRE

October 1-3: American Equilibration Society Satellite Program, Hyatt Regency Hotel, Acapulco, Mexico. Contact: The American Equilibration Society, 8726 North Ferris Ave., Morton Grove, Illinois, 60053, 312-965-2888.

October 4-5: Eighth International Congress of Dental Technicians, Cologne, Germany. Contact: Messe-und Ausstellungs Ges. m.b.h., Koln, Messeplatz, Postfach 210760. D-5000, Koln, 21, Deutz.

October 18-20: The American Association of Public Health Dentistry 47th

annual meeting, Atlanta, Georgia. Abstracts must be submitted by May 1, 1984 to: Dr. Myron Allukian, Program Chairman, 818 Harrison Ave., Boston, Mass. USA, 02118.

October 18-20: Canadian Academy of Prosthodontics Annual meeting, Toronto, Ontario. Contact: Dr. B.M. Jackson, 22-22 Water St., S. Kitchener, Ont., N2G 4K4.

October 18-20: Czechoslovak Congress on Stomatology, Congress Hall, Health Resort Island, in Piestany, Czechoslovakia. Contact: The Congress Secretariat, Slovak Medical Society, Mrs. V. Kralicova, Mickiewiczova, 18, 813 22 Bratslava, Czechoslovakia.

October 19-20: The Association of Prosthodontists of Canada annual meeting, Westin Hotel, Toronto, Ontario. Contact: Dr. Andrew Tynio, 304-2425 Bloor St. West, Toronto, Ontario, M6S 4W4.

October 26-29: Annual meeting of the Pacific Dental Federation, MGM Grand Hotel, Las Vegas, Nevada, USA. Contact: Mr. Jack Small, Skyline Travel, 615 W. Hastings St., Vancouver, B.C., V6B 1M8, 604-685-6102.

October 28: Dental Horizons Inc. is presenting a seminar entitled "Effective Practice Management Techniques: The Ideal Practice", Bronx New York. Contact: Dr. L. Zucker, 3201 Grand Concourse, Bronx, New York, 10468, 212-933-5510.

NOVEMBER/NOVEMBRE

November 4-7: A course entitled "Plating and Screw Osteosynthesis in Maxillo-facial Trauma, Reconstructive and Orthognathic Surgery" will be presented by the Department of Otolaryngology, State University of New York, Upstate Medical Centre, Syracuse, New York, at the Cloisters, Sea Island, Georgia. For registration contact: Ms. Andee Samartino, AO/ASIF Secretary, P.O. Box 514, Wayne, PA., 19087.

November 5-10: 11th Asian Pacific Dental Congress, Excelsior Hotel, Hong Kong. Contact: Congress Secretariat, International Conference Consultants, 57 Wyndham St., First Floor, Central, Hong Kong.

November 8-10: The International Conference on Oral Trauma, sponsored in part by the American Association of Endodontists. Registry Hotel, Dallas Texas. Contact: The American Association of Endodontists, 211 E. Chicago Avenue, Chicago Ill. USA 60611, or Dr. Paul Radman, 8226 Douglas, Suite 810, Dallas, Texas, 75225.

November 14-16: Scandinavia's largest international trade fair "Swedental '84" will be held in Stockholm, Sweden. Contact: Strusberg/Hewitt/Radley, U.S. representatives, 6671 Sunset Blvd., Suite 1525, Los Angeles, California, 90028, 213-462-6260.

November 22: The Toronto Academy of Dentistry Winter Clinic, Royal York Hotel, Toronto, Ontario. Contact the Academy, 234 St. George St., Toronto, Ont., M5R 2P2. 416-967-5649.

DECEMBER/DÉCEMBRE

December 1984: The Indian Dental Association's 39th annual conference, Bombay India. Contact: Dr. L. K. Ghandi, Conference Secretary, 39th IDA Conference, C-56, N.D.S.E., Part II, New Delhi, 10049.

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January 1985: Second International Conference "Clinical Factors and Mechanisms Influencing Bone Growth", University of California, Los Angeles, Calif. Abstracts submitted no later than June 30, 1984. Contact: Andrew Dixon or Bernard Sarnat, Dental Research Institute, School of Dentistry, School of Medicine, Centre for Health Sciences, University of California, Los Angeles (UCLA), Los Angeles, California, 90024.

May 12-17, 1985: The 24th Australian Dental Congress will be held in Brisbane, Australia. The Congress is hosted by the Australian Dental Association. Contact: The Congress Secretariat, P.O. Box 29, Parkville, Vic., Australia 3052.

September 2-7, 1985. Fifth International Congress on Cleft Palate and Related Craniofacial Anomalies, Monte Carlo, Congress Centre. Contact: Chairman, Dr. Rene Malek, 6 rue Erlanger, 75016, Paris, France, or SOCFI, 14 rue Mandar, 75002, Paris, France.

September 21-27, 1985: The 73rd Annual World Dental Congress of the FDI, Belgrade Yugoslavia. Contact: Organizing Committee, 73rd FDI Congress, Sava Centar, Milentija, Popovica 9, 11070 Belgrade, Yugoslavia.

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1. Johnson RH, Rozanis J, Schofield IDF et al. The Effect of Spiramycin on Plaque Accumulation and Gingivitis. Canad Dent Assn J 1978;10:456-60.
2. Bénazet F, Dubost M. Apparent Paradox of Antimicrobial Activity of Spiramycin. Antibiotics Annual 1958-59:211-20.
3. Mills WH, Thompson GW, Beagrie GS. Clinical Evaluation of Spiramycin and Erythromycin in Control of Periodontal Disease. J Clin Periodontol 1979;6:308-16.
4. Kernbaum S. La spiramycine: Utilisation en thérapeutique humaine. Sem Hôp Paris 1982; 58(5):289-97.

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Bask Computer Systems 441
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CDSPI 456, 466, 483, 492
Colgate Palmolive 458
Computer Utility Management Ltd. 444
Dencis 472
General Motors of Canada . . . 437
Issac Walton Killam Hospital for Children 498
McNeil Pharmaceutical (Canada) Ltd. 438, 477
Nobilium Canada Inc. 457
Northern Alberta Institute of Technology . . . . . 474(a)
Pfingst 498
Procter and Gamble . . . . . IFC
Rhone-Poulenc Pharma . 482, 494
Henry Schein Inc. 460
Warner Lambert . . . . . OBC, 481
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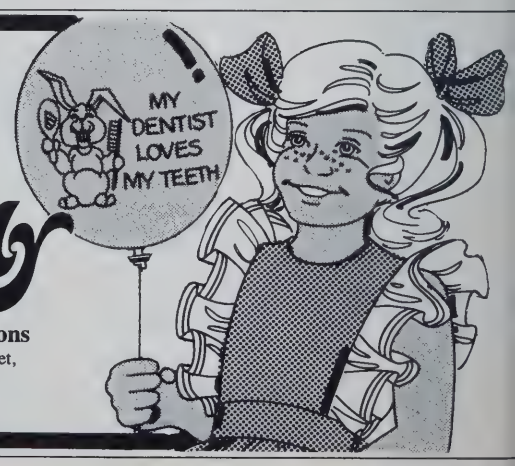

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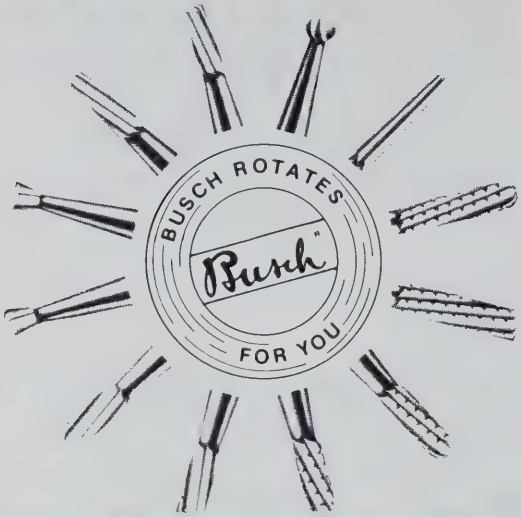

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